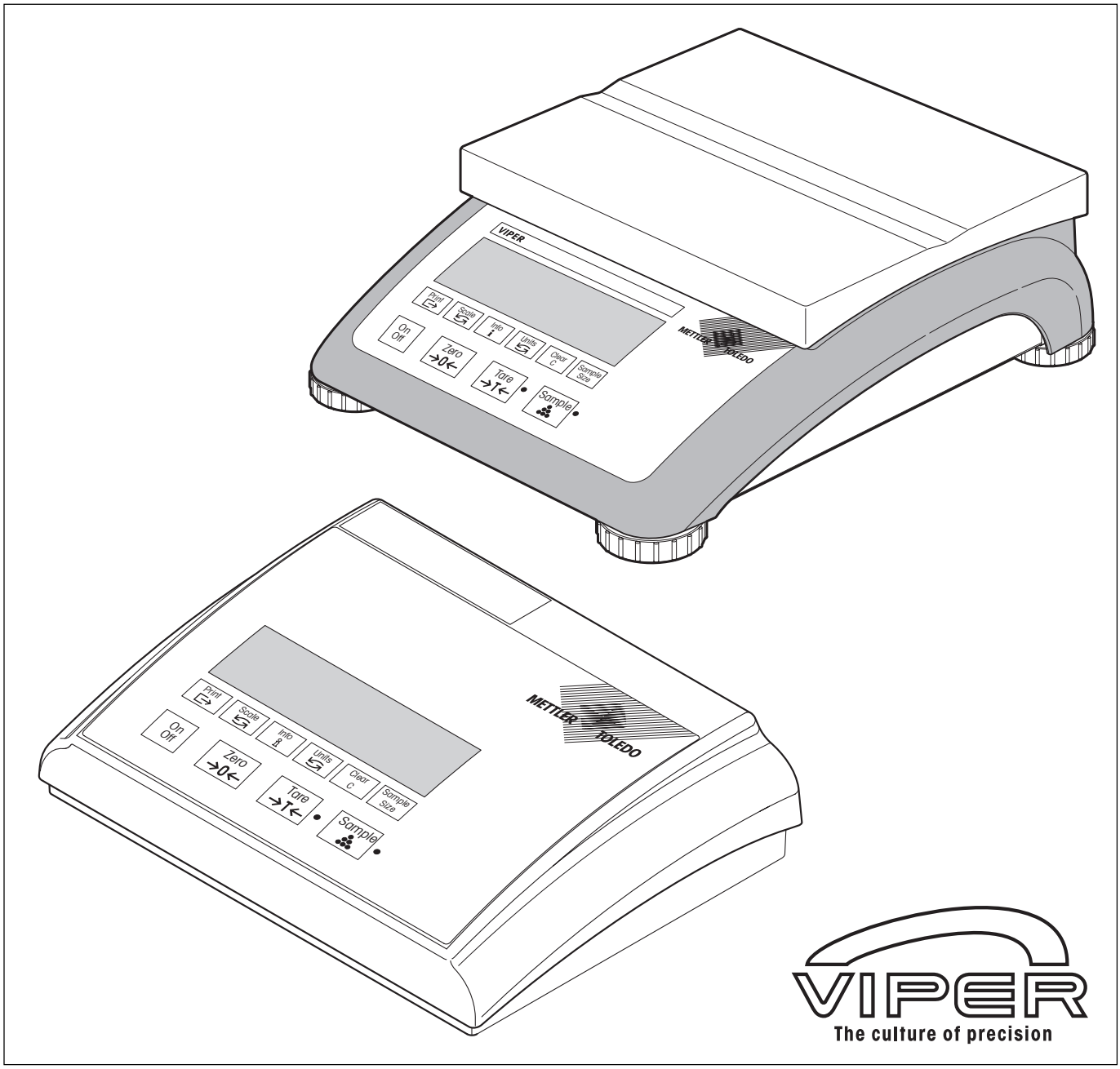
METTLER TOLEDO

Service Manual

METTLER TOLEDO
Viper M, L, D and T Scales
Viper RM, RL, RD and RT Terminals



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Section 1

General

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1 How to use this service manual

1.1 General

This service manual contains instructions for the repair and maintenance work to be performed by service engineers.

It is assumed that the reader is familiar with the operation of the scales and terminals, and can refer to the relevant operating instructions when necessary.

1.2 Layout of the service manual

This manual comprises nine main sections:

- **General**: Section 1gives instructions on using the service manual, and also provides an overview of the Viper scales and terminals covered by it.
- **Viper scales with small platform**: Section 2 contains the exploded view drawings and spare parts lists for Viper scales with the small platform.
- **Viper scales with large platform**: Section 3 contains the exploded view drawings and spare parts lists for Viper scales with the large platform.
- **Viper terminals**: Section 4 contains the exploded view drawings and spare parts lists for Viper terminals, as well as a list of available upgrade kits.
- **Repair of Viper scales**: Section 5 describes all repair work and the replacement of components for Viper scales with large and small platforms.
- **Repair of Viper terminals**: Section 6 describes all repair work and the replacement of components for Viper terminals.
- **Technician setup**: Section 7 describes how to enter scale data, calibrate the weighing system and use the diagnostic functions.
- **Miscellaneous information**: Section 8 contains technical information on the Viper product group, plus an overview of all load cells and preloads and a table of geographical adjustment values. In addition you will find instructions on connecting weighing platforms to Viper terminals and information on appropriate load cells, as well as important information on attaching a second weighing platform the the optional analog interface of Viper scales and terminals.
- **Software**: Section 9 contains information on the various software versions. It also describes typical error messages that can appear following service work and provides troubleshooting instructions.

1.3 Working with the service manual

The section number and title are printed in the header of every page in the service manual. Each footer shows the order number for the manual, the date issued and the page number.

The pages are numbered in the footer. First comes the section number, then a hyphen followed by the page number, starting with 1 in every section.

The exploded view drawings are provided as a guide for disassembly and assembly work and for identifying the order numbers for spare parts.

When ordering spare parts, please use the information given in the spare parts lists. The item numbers in the first column correspond to those on the exploded view drawing opposite.

2 Service concept

The scales have been designed so that defective components can be replaced with just a few simple tools. The LC-PT45 printer for service is not required, as almost all parameters can be configured with the keyboard of the scale (in special cases temperature compensation data of the MonoBloc load cell may need to be entered using a computer).
As you can see, we have kept it simple for efficient servicing.

3 Introducing the Viper scales product group

The Viper scales product group comprises the following models, which are all covered by this manual:

Viper M scales

Viper M scales possess basic weighing functions for simple weighing duties. Special versions of these scales are also available (Viper EX M and Viper EX M MB) for use in explosion hazard zones (Class 1, Division 1) with the PSUx power supply unit or the PSU power supply unit/interface.

Viper L scales

In addition to basic weighing functions, Viper L counting scales also have built-in functions for piece counting. An extended keypad and a display with a visual weighing-in aid are available in order to use these additional functions.

Viper D scales

Viper D scales are counting scales providing an additional numeric keypad and ID functions.

Viper T scales

Viper T scales are the top-of-the-range models in the product group. These counting scales support a wide array of useful functions. They have a dot matrix display with graphics capability and a numeric keypad. The various menu functions are controlled by soft keys in the display, i.e. context-sensitive screen buttons which change according to the momentary status of the menu. This scale type is also available for applications other than piece counting (such as SQC 16 and Remote).

Common features

Apart from the differences with regard to functions and operating and display elements, all models in the Viper product group have the following common features:

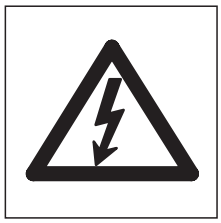
- Depending on the weighing range, some models are only available with the small platform, some only with the large platform and some with both. The essential difference between the two platform sizes is in their external dimensions and the type of load cell used.
- All models are designed either for direct connection to the AC power line or contain a built-in rechargeable battery. Rechargeable battery scales are connected to the AC power line via an AC adapter. Viper EX scales are powered by an external AC adapter.
- All models are certifiable.
- The load cells are either of the strain gauge or MonoBloc type.

4 The Viper terminals

In terms of functionality and features the Viper RM, RL, RD and RT terminals exactly match the respective scale models (M, L, D and T, see above). Using appropriate weighing platforms the Viper terminals allow to build customized weighing systems.

5 Safety

When carrying out service or repair work, always observe the following:

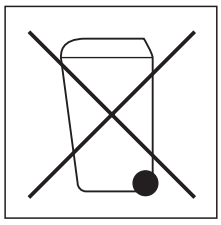


- Before opening the scale or terminal, isolate it from the AC power line (pull out the plug).

- The scales and terminals contain precision electronic components that are sensitive to **electrostatic discharge**. We recommend that you wear a grounding wrist strap when doing any work in the interior of the scale or terminal, in order to prevent any electrostatic charge building up. Grounding wrist straps are commercially available from electronic component suppliers.

- **Servicing work in explosion hazard zones is strictly prohibited.** Ignition power could inadvertently be generated, causing an explosion. **Servicing work should therefore only be undertaken in secure areas.** Please also observe all special instructions in this Service Manual relating to work on Viper scales that are approved for use in potentially explosive environments. Such instructions are indicated by the adjacent symbol.

6 Environmental protection



Disposal of rechargeable batteries

Some models in the Viper product group have a built-in **rechargeable battery**. This contains heavy metals which could be hazardous to the environment. The battery is therefore classified as a hazardous waste, which must not be disposed of as normal domestic refuse. Please ensure that used batteries are disposed of correctly in accordance with the relevant local regulations.

Disposal of electronic components

Dispose of defective components in strict compliance with all local and national regulations! In many countries electronic components are classified as hazardous waste for whose disposal there are special regulations. In some countries electronic components are collected separately for recycling. If necessary, find out the applicable regulations from the local authorities!

Section 2

Viper scales with small platform

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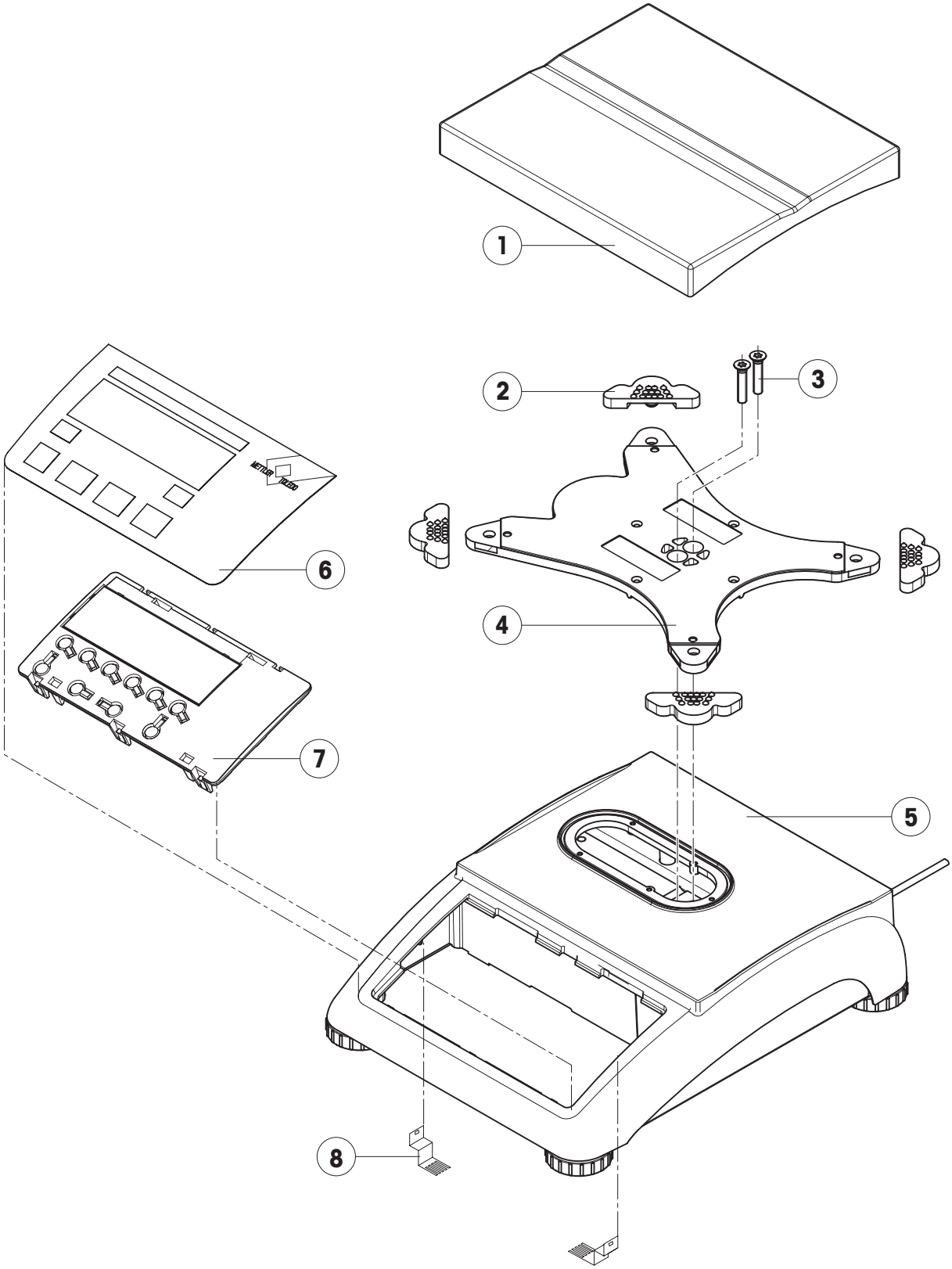
Repair: see Section 5

1 Scales

1.1 Scales with strain gauge load cells (not including Ex version)



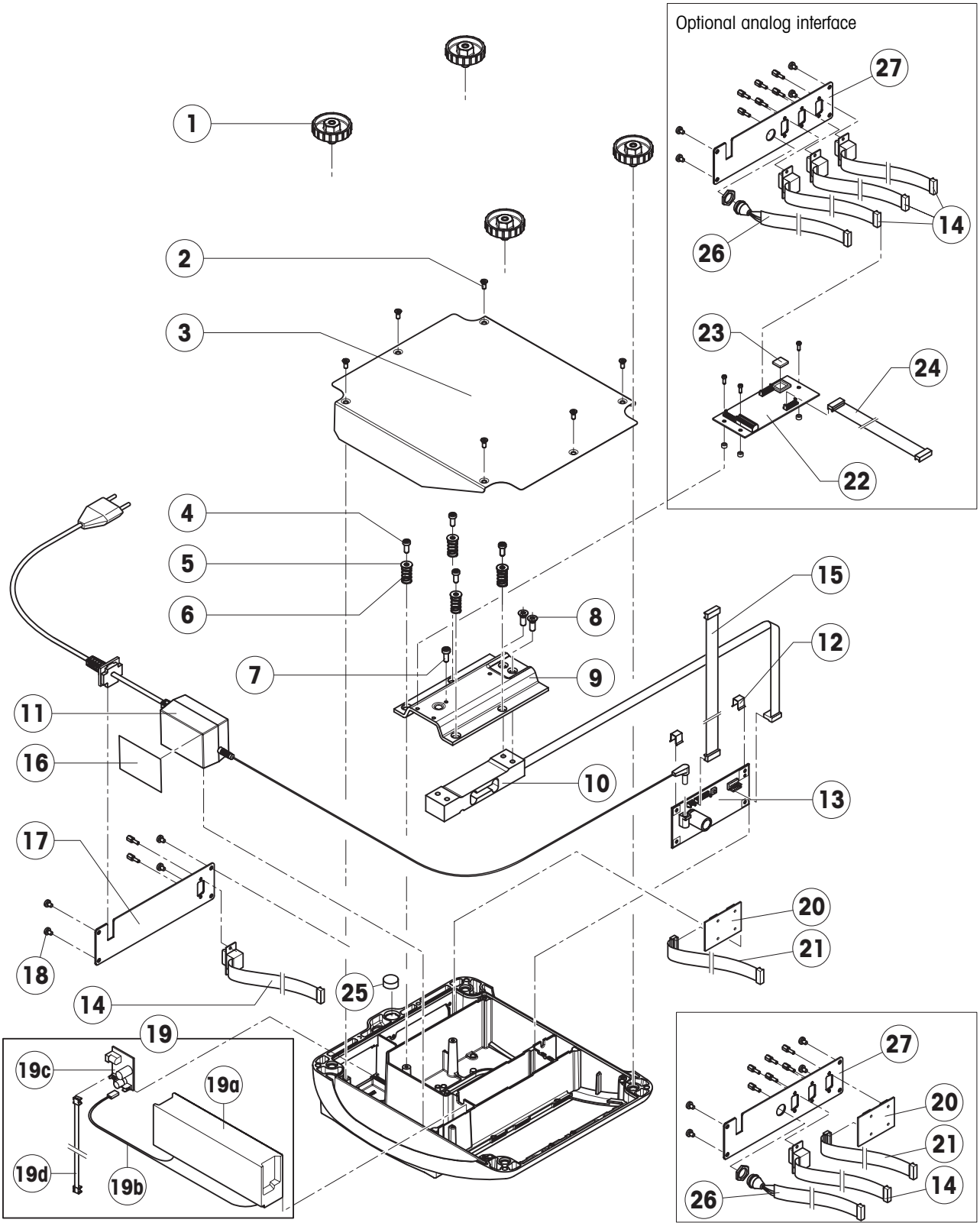
Item	Quantity	Description	Order No.
1	1	platter 7.9" x 9.5" (200 x 240 mm)	21203071
2	4	rubber cushion (1 piece) [1)]	21203073
3	2	countersunk Torx screw M6 x 30	*
4	1	pan support plate 7.9" x 9.5" (200 x 240 mm)	–
5	1	housing, VIPER with small platform	–
6	1	keypad overlay	Chapter 2
7	1	mounting plate and display unit (digital PCB with LCD and back-light unit)	Chapter 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

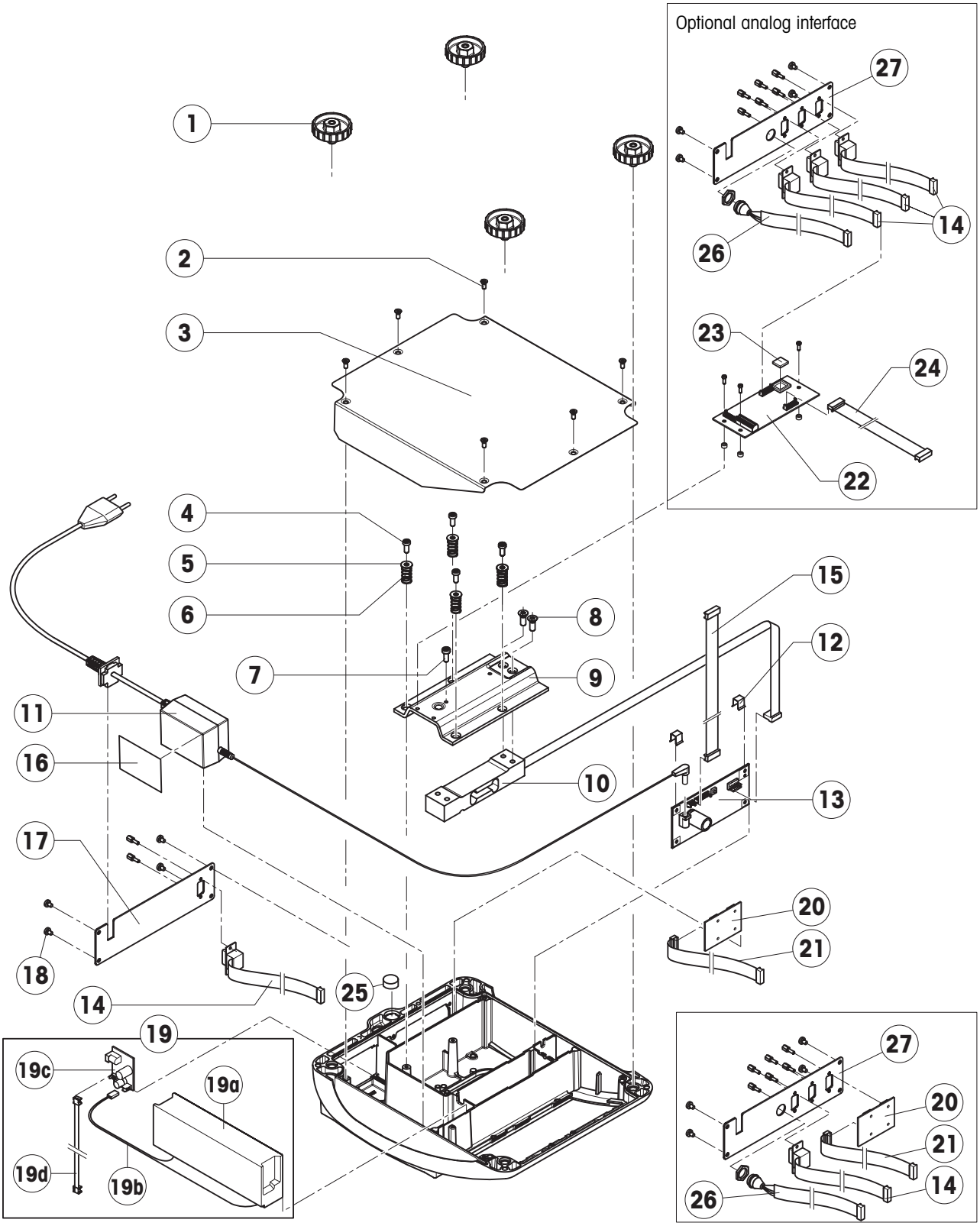
[1)] New rubber cushions have a hole in the surface to assist with assembly. A pin can be used to insert the cushion into the corresponding drilled hole in the pan support plate. Earlier rubber cushions did not have this assembly aid.

Scales with strain gauge load cells (continued)



Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 1.7" (44 mm)/ M10 x 0.75 mm	21203109
2	6	countersunk Torx screw M4 x 10	*
3	1	bottom plate for small platform model	–
4	4	button head Torx screw M4 x 12	*
5	4	wide flange washer 4.3 x 20	*
6	4	overload spring	**
7	1	overload stop adjustment screw (with certain production series only)	**
8	2	countersunk Torx screw M6 x 16	*
9	1	overload plate for small platform model	–
10	1	**load cell with cable** (certifiable) (**Note**: only "LC..." load cells are available as spare parts!)	
		Weighing range 7.5 lb (3 kg): C5MRS **or** LC0765-5-MRV	(21203143) **21203873**
		Weighing range 12 lb (6 kg): C10MRS **or** LC0765-10-MRV	(21203144) **21203874**
		Weighing range 24 lb (12 kg): C20MRS **or** LC0765-20-MRV	(21203145) **21203875**
11	1	**bench AC adapter**:	
		US version, internal (always order together with item 16)	21203122
		US version **for scales with rechargeable battery and Viper T scales**	21255102
12	2	spring clip *	21203166
13	1	analog PCB Viper DMS	21203092
14	1	RS cable 18.1" (460 mm)	21203168
15	1	A/D cable 4.3" (110 mm) for small platform model	21203164
16	1	adhesive patch for AC adapter or battery	21203184
17	1	RS connector plate for Viper M/L/D (various types, depending on the equipment)	–
18	4	raised cheese head Torx screw M4 x 6	*
19		**For scales with rechargeable battery only**:	
19a	1	rechargeable battery 12V/2,2Ah (always order together with item 16)	21203232
19b	1	battery cable (charging PCB – battery)	21203231
19c	1	charging circuit print	21204033
19d	1	connection cable (charging PCB – analog PCB)	21203233

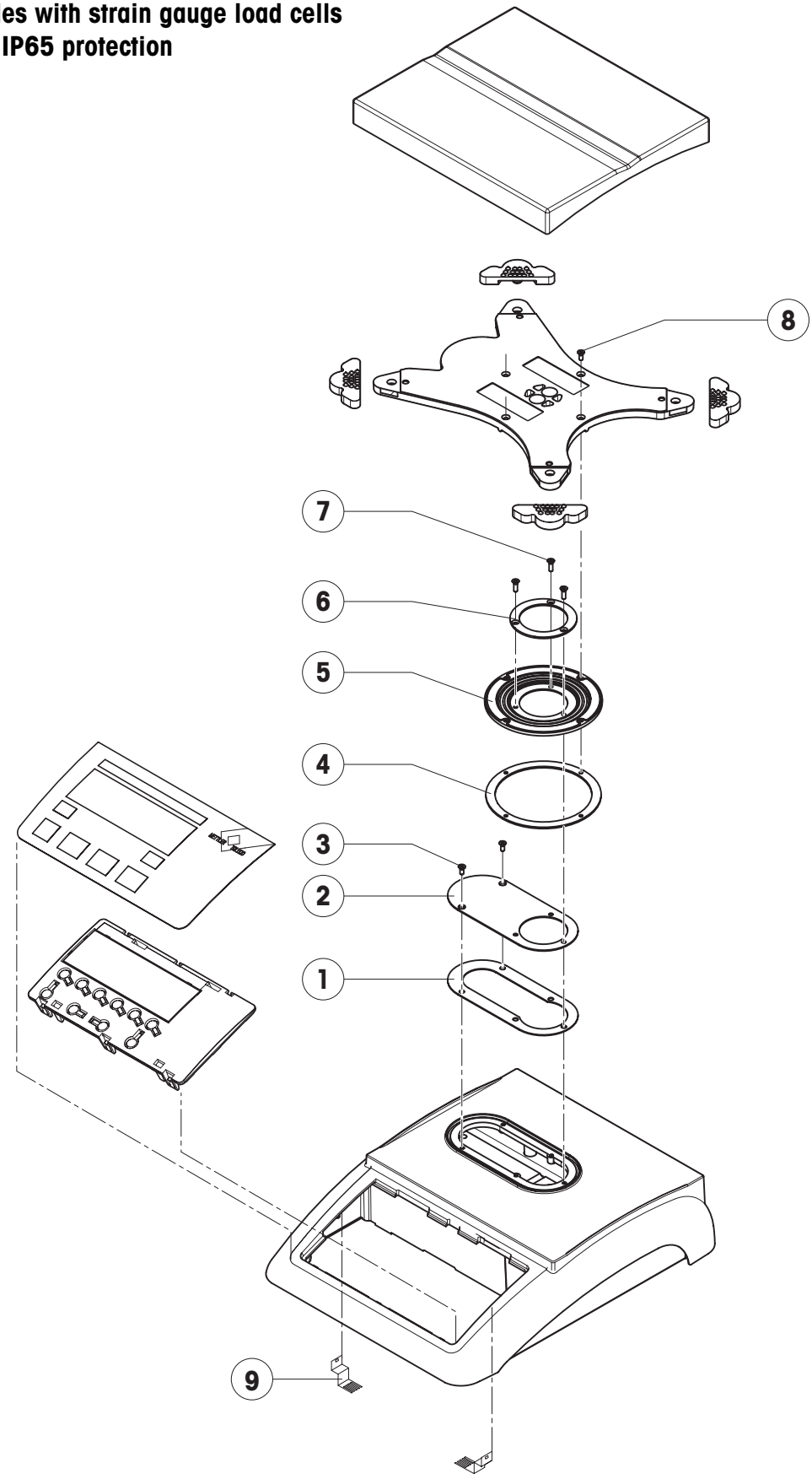
Scales with strain gauge load cells (continued)



20	1	PCB RS option (2 x RS232C), standard with Viper T	21203476
21	1	connection cable RS option 15" (380 mm)	21203490
22	1	PCB optional analog interface	21203383
23	1	**EPROM with interface software (for optional analog interface)**	
		EPROM for Viper L and D analog interface	21203915
		EPROM for Viper T analog interface	21255318
24	1	connection cable for optional analog interface 9.9" (250 mm)	21203604
25	1	level bubble	21203204
26	1	PS2 cable 18.1"/460 mm, (keyboard connection, for Viper T only)	21204107
27	1	connector plate Viper T for 3 RS interfaces and 1 keyboard cable: standard scale: 1x PCB RS Option, 1x RS cable 18.1", 1x PS2 cable scale with optional analog interface: 3x RS cable 18.1", 1x PS2 cable	–

* included in the fasteners set (chapter 3) ** see section 4 "Replacing the load cell" – not available as spare part

1.2 Scales with strain gauge load cells and IP65 protection



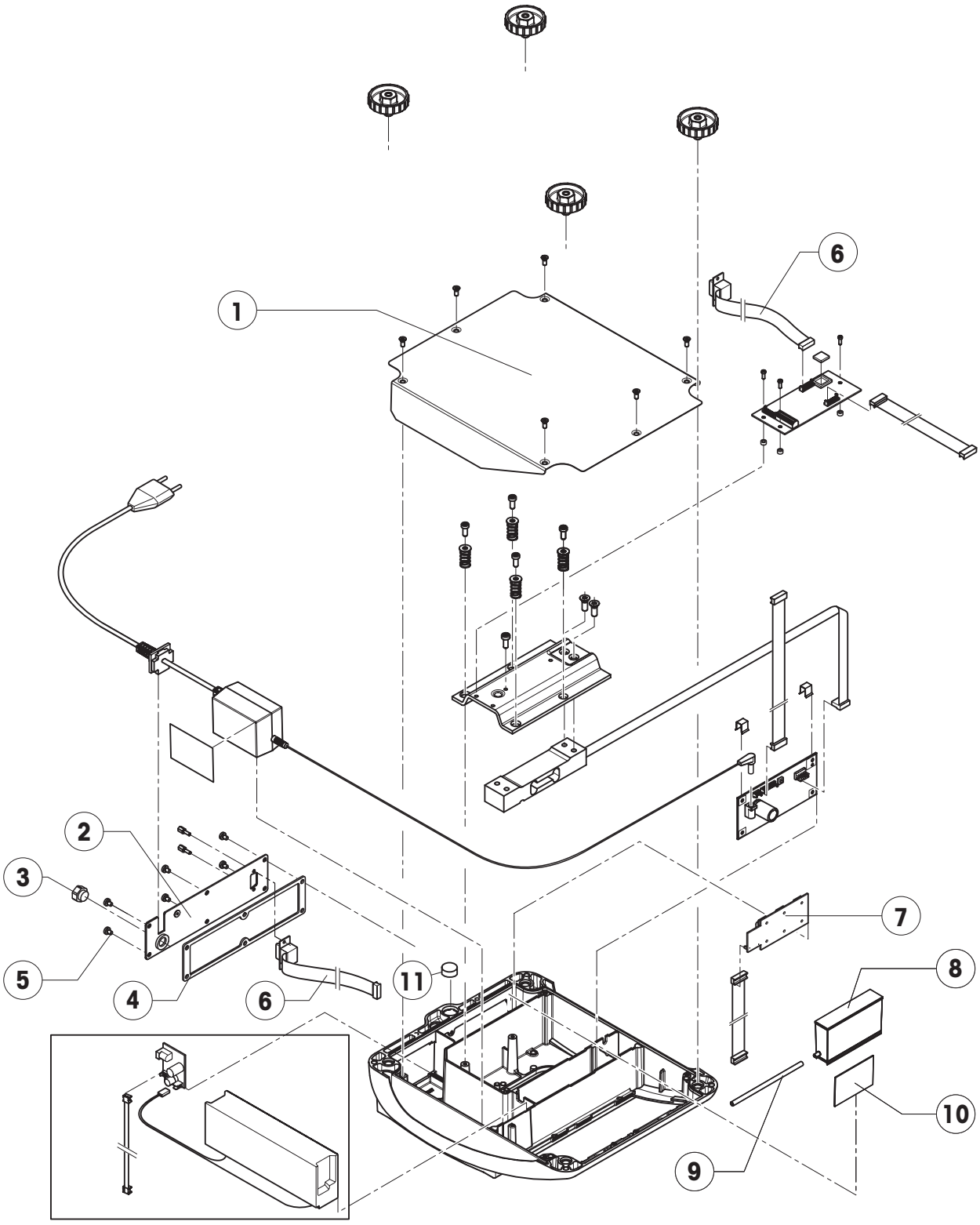
Item	Quantity	Description	Order No.
1	1	packing for cover plate	21203235
2	1	cover plate	–
3	2	countersunk Torx screw M3 x 8	*
4	1	flange D = 100 mm	–
5	1	diaphragm	21203077
6	1	flange D = 58 mm	–
7	3	countersunk Torx screw M3 x 10	*
8	4	countersunk Torx screw M3 x 8	*
9	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Note: Parts of the scale not numbered in the illustration are included in the normal version (chapter 1.1).

Scales with strain gauge load cells and IP65 protection (continued)



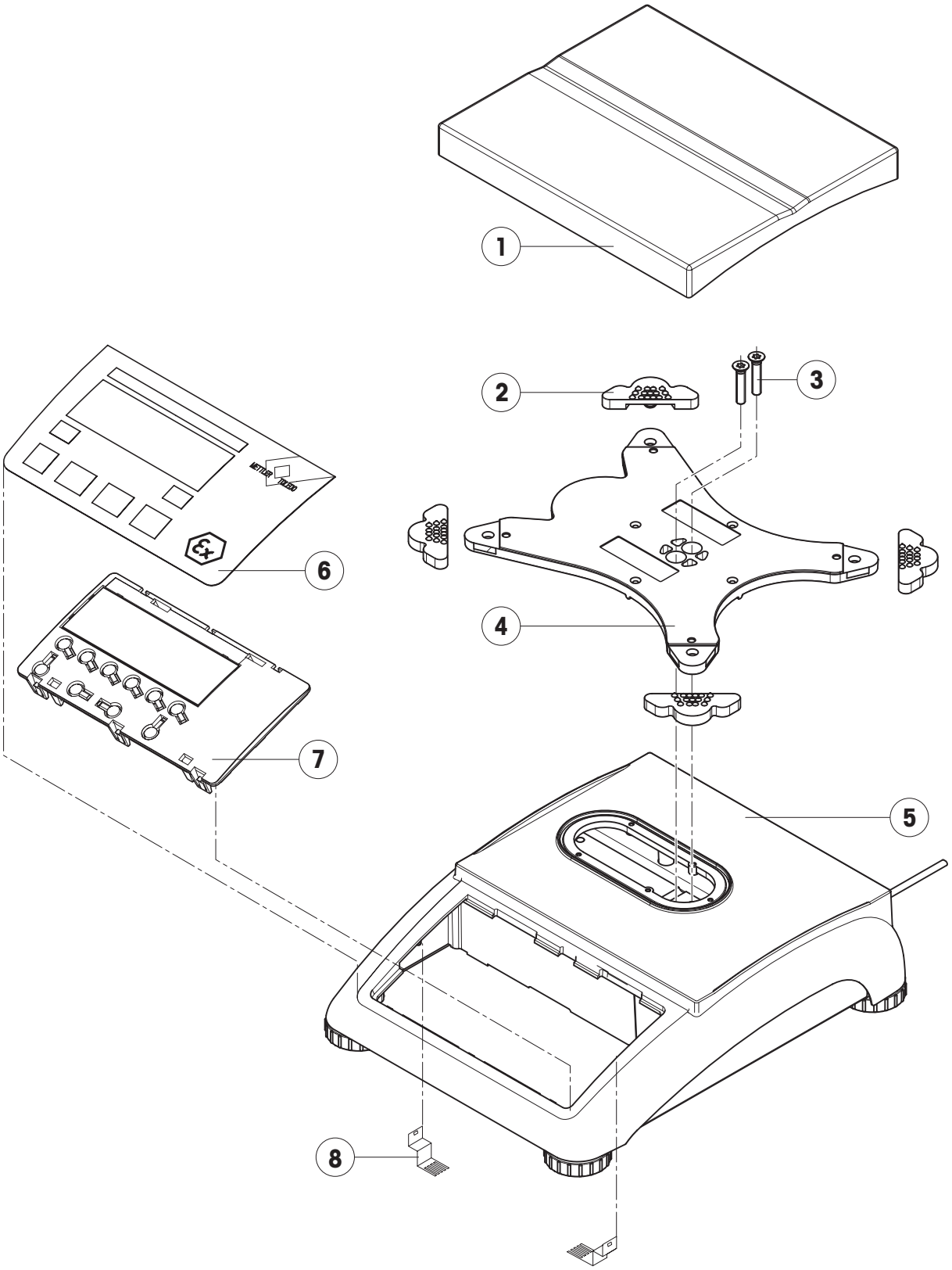
Item	Quantity	Description	Order No.
1	1	bottom plate for small platform model IP65 version	21203511
2	1	RS connector plate IP65 version (various types, depending on the equipment)	–
3	1	air supply/extraction filter	21203860
4	1	packing for RS connector plate	21203236
5	6	raised cheese head Torx screw M4 x 6	*
6	1	RS cable 460 mm IP65	21203717
7	1	PCB RS option (2 x RS232C) IP65	21255081
8	1	pressure equalizer	21203611
9	1	pressure equalizer tube LA	21203862
10	1	adhesive patch for pressure equalizer	21203184
11	1	level bubble	21203204

* included in the fasteners set (chapter 3)

– not available as spare part

Note: Parts of the scale not numbered in the illustration are included in the normal version (chapter 1.1).

1.3 Scales with strain gauge load cells, Ex version



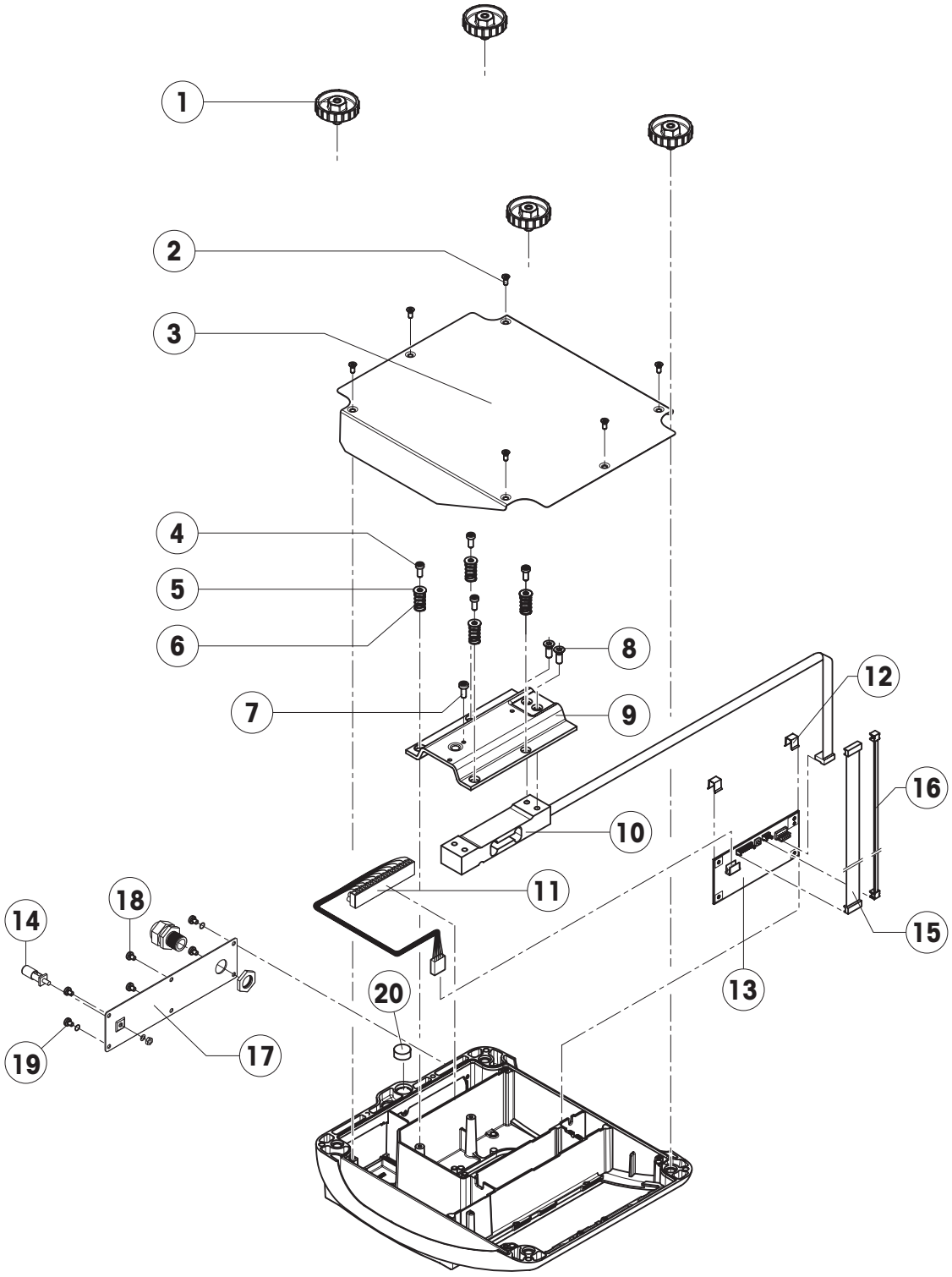
Item	Quantity	Description	Order No.
1	1	platter 7.9" x 9.5" (200 x 240 mm)	21203071
2	4	rubber cushion (1 piece) [1)]	21203073
3	2	countersunk Torx screw M6 x 30	*
4	1	pan support plate 7.9" x 9.5" (200 x 240 mm)	–
5	1	housing, VIPER with small platform	–
6	1	keypad overlay	Chapter 2
7	1	mounting plate and display unit (digital PCB with LCD and back-light unit)	Chapter 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

[1)] New rubber cushions have a hole in the surface to assist with assembly. A pin can be used to insert the cushion into the corresponding drilled hole in the pan support plate. Earlier rubber cushions did not have this assembly aid.

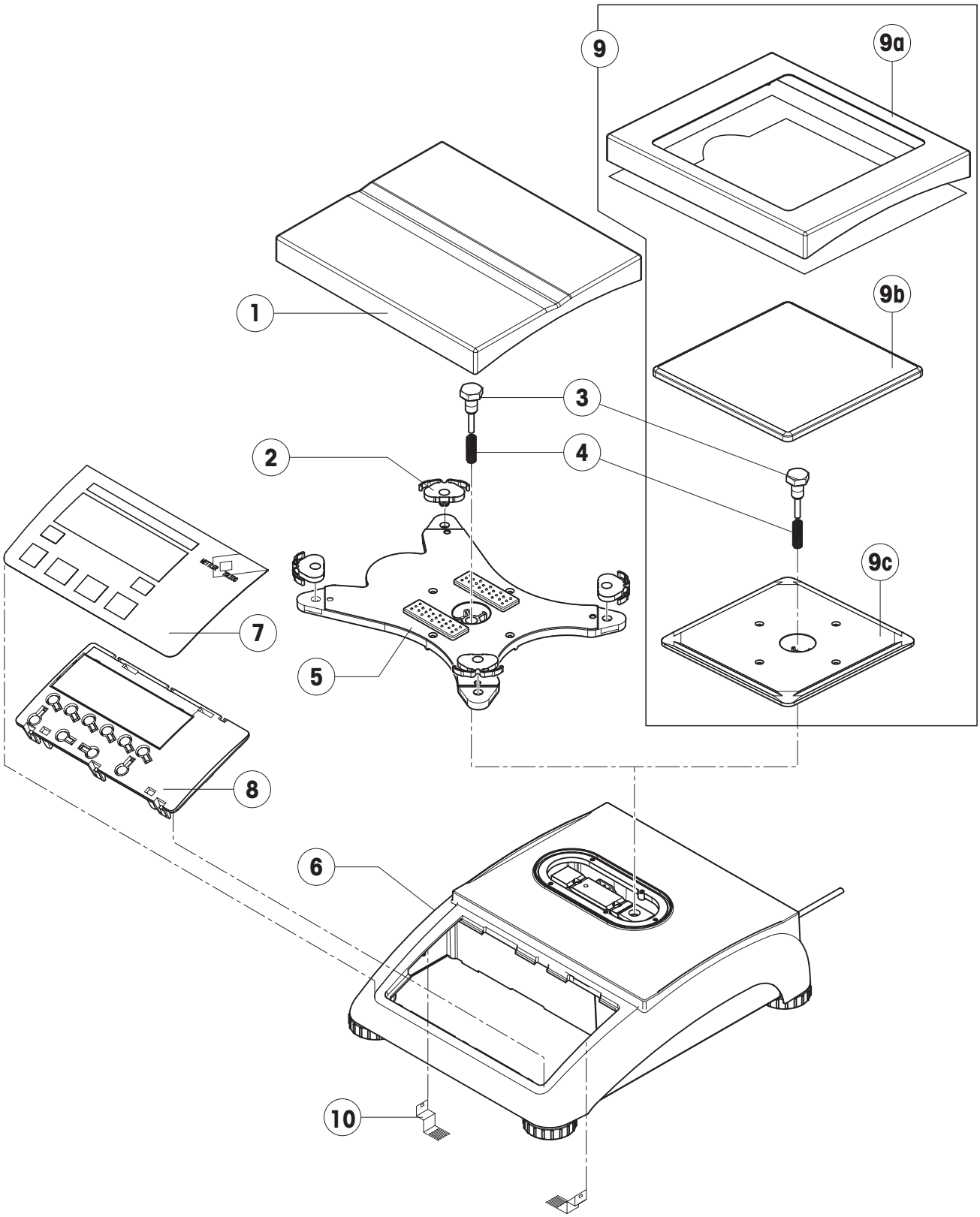
Scales with strain gauge load cells, Ex version (continued)



Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 1.7" (44 mm)/ M10 x 0.75 mm	21203109
2	6	countersunk Torx screw M4 x 10	*
3	1	bottom plate for small platform model	–
4	4	button head Torx screw M4 x 12	*
5	4	wide flange washer 4.3 x 20	*
6	4	overload spring	**
7	1	overload stop adjustment screw (with certain production series only)	**
8	2	countersunk Torx screw M6 x 16	*
9	1	overload plate for small platform model	–
10	1	**load cell with cable** (certifiable)	
		Weighing range 7.5 lb (3 kg): LC0765-5-MRV	21203873
		Weighing range 12 lb (6 kg): LC0765-10-MRV	21203874
		Weighing range 24 lb (12 kg): LC0765-20-MRV	21203875
11	1	wire harness Ex	21203732
12	2	spring clip *	21203166
13	1	analog PCB Viper Ex DMS	21203577
14	1	grounding screw EX	21050066
15	1	A/D cable 4.3" (110 mm) for small platform model	21203164
16	1	connection cable Ex 4 pins	21203852
17	1	connector plate Ex	–
18	4	raised cheese head Torx screw M4 x 6	*
19	2	raised cheese head Torx screw M4 x 8 with tooth lock washer	–
20	1	level bubble	21203204

* included in the fasteners set (chapter 3) ** see section 4 "Replacing the load cell" – not available as spare part

1.4 Scales with MonoBloc load cells (not including Ex version)

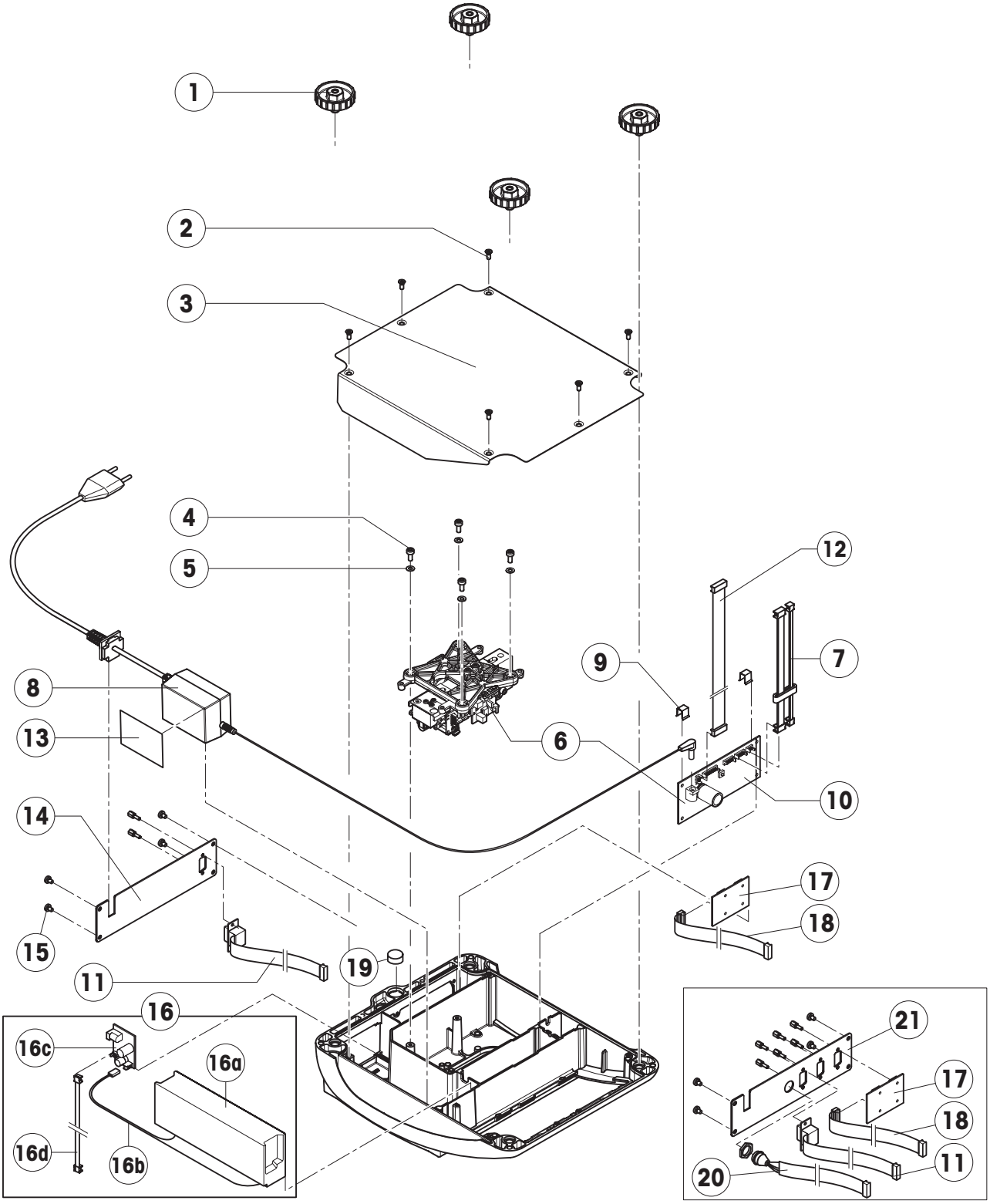


Item	Quantity	Description	Order No.
1	1	platter 7.9" x 9.5" (200 x 240 mm) for 12 lb scale (6 kg)	21203071
2	4	pan mount (rubber cushion)	21203238
3	1	hexagon screw for load plate support	–
4	1	fastener spring	–
5	1	load plate support 7.9" x 9.5" (200 x 240 mm)	–
6	1	housing VIPER with small platform	–
7	1	keypad overlay	Chapter 2
8	1	mounting plate and display unit (digital PCB and display compl.)	Chapter 2
9		**For 6 lb (3 kg) model only**:	
9a	1	draft shield and screen	21203849
9b	1	platter 6.5" x 6.5" (165 x 165 mm)	00225158
9c	1	load plate support 16.5" x 6.5" (165 x 165mm)	–
10	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Scales with MonoBloc load cells (continued)

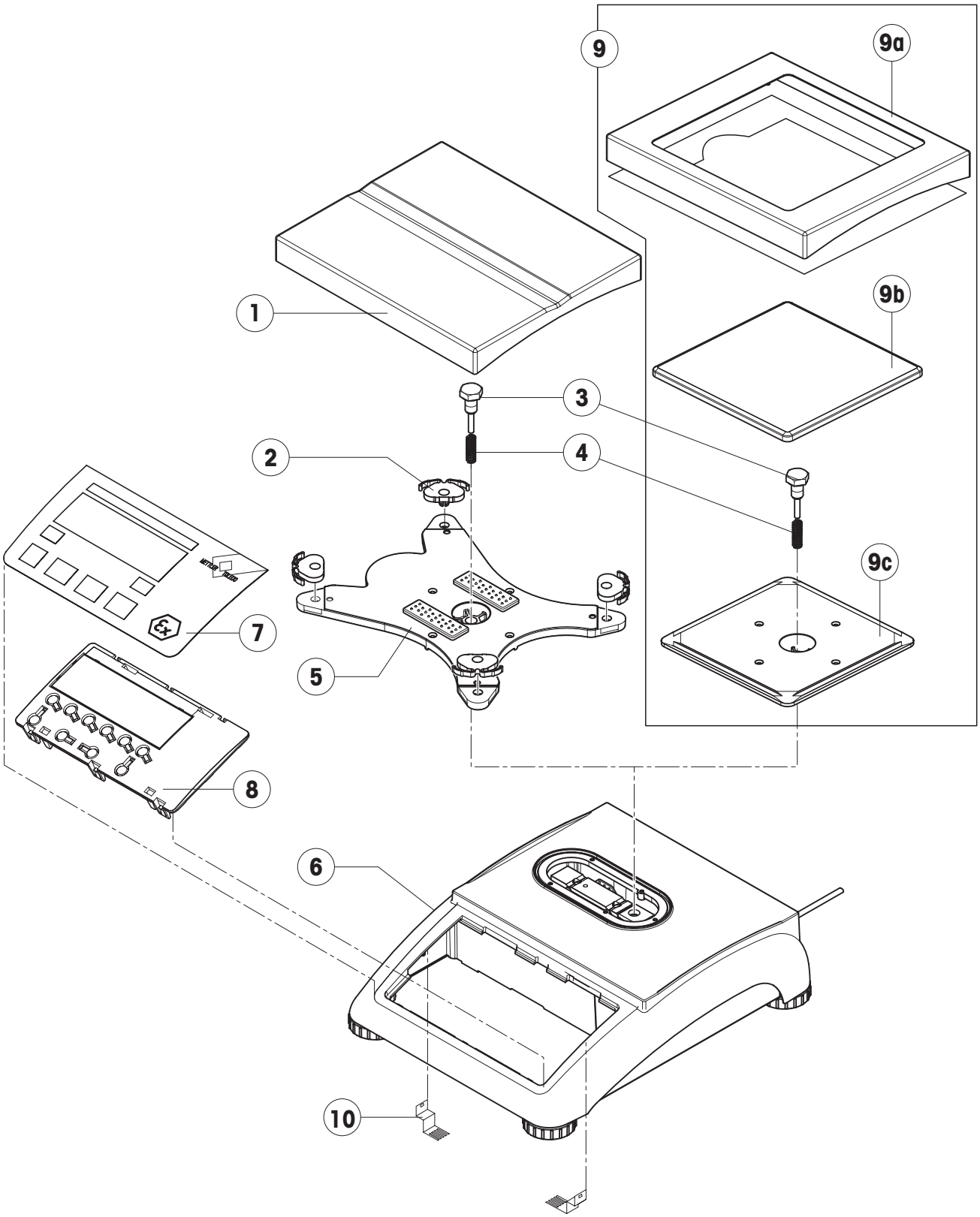


Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 1.7" (44 mm)/ M10 x 0.75 mm	21203109
2	6	countersunk Torx screw M4 x 10	*
3	1	bottom plate for small platform model	–
4	4	cylinder head Torx screw M4 x 12	*
5	4	flange washer 4.3 x 9	–
6	1	**weighing modules** (load cell and analog PCB):	
		weighing module 3002 for 6 lb scale (3 kg)	11102685
		weighing module 6001 for 12 lb scale (6 kg)	11102686
7	1	cell cable MB SM with ferrite ring	21203289
8	1	**bench AC adapter**:	
		US version, internal (always order together with item 13)	21203122
		US version **for scales with rechargeable battery and Viper T scales**	21255102
9	2	spring clip *	21203166
10	1	analog PCB Viper MonoBloc	21203100
11	1	RS cable 18.1" (460 mm)	21203168
12	1	A/D cable 4.3" (110 mm), for small platform model	21203164
13	1	adhesive strip for AC adapter or battery	21203184
14	1	RS connector plate for Viper M/L/D (various types, depending on the equipment)	–
15	4	raised cheese head Torx screw M4 x 6	*
16		**For scales with rechargeable battery only**:	
16a	1	rechargeable battery 12V/2,2Ah (always order together with item 13)	21203232
16b	1	battery cable (charging PCB – battery)	21203231
16c	1	charging circuit print	21204033
16d	1	connection cable (charging PCB – analog PCB)	21203233
17	1	PCB RS option (2 x RS232C), standard with Viper T	21203476
18	1	connection cable RS option 15" (380 mm)	21203490
19	1	level bubble	11101335
20	1	PS2 cable 18.1"/460 mm, (keyboard connection, for Viper T only)	21204107
21	1	connector plate Viper T for 3 RS interfaces and 1 keyboard cable (1x PCB RS Option, 1x RS cable 18.1", 1x PS2 cable)	–

* included in the fasteners set (chapter 3)

– not available as spare part

1.5 Scales with MonoBloc load cells, Ex version

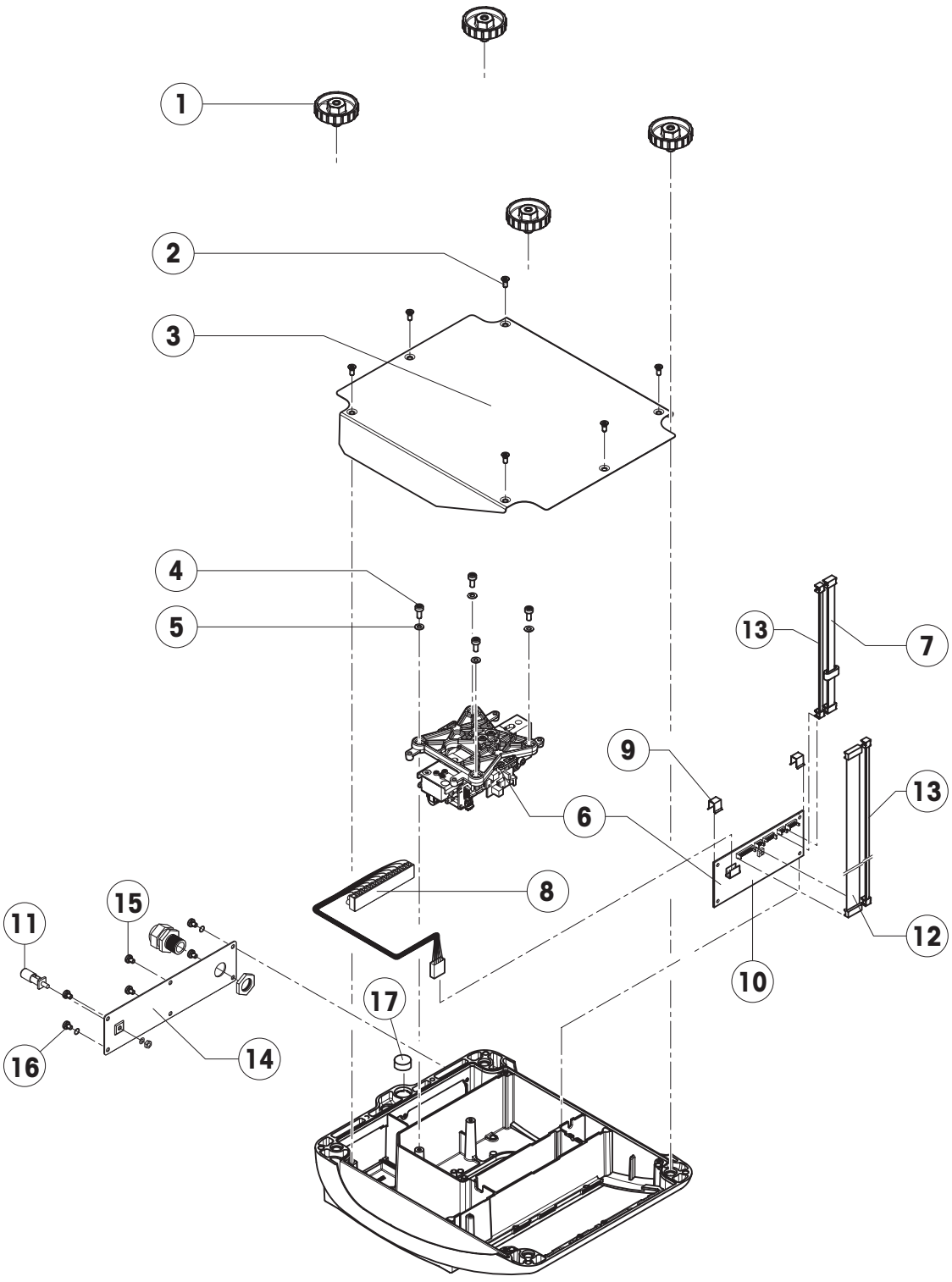


Item	Quantity	Description	Order No.
1	1	platter 7.9" x 9.5" (200 x 240 mm) for 12 lb scale (6 kg)	21203071
2	4	pan mount (rubber cushion)	21203238
3	1	hexagon screw for load plate support	–
4	1	fastener spring	–
5	1	load plate support 7.9" x 9.5" (200 x 240 mm)	–
6	1	housing VIPER with small platform	–
7	1	keypad overlay	Chapter 2
8	1	mounting plate and display unit (digital PCB and display compl.)	Chapter 2
9		**For 6 lb (3 kg) model only**:	
9a	1	draft shield and screen	21203849
9b	1	platter 6.5" x 6.5" (165 x 165 mm)	00225158
9c	1	load plate support 16.5" x 6.5" (165 x 165mm)	–
10	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Scales with MonoBloc load cells, Ex version (continued)



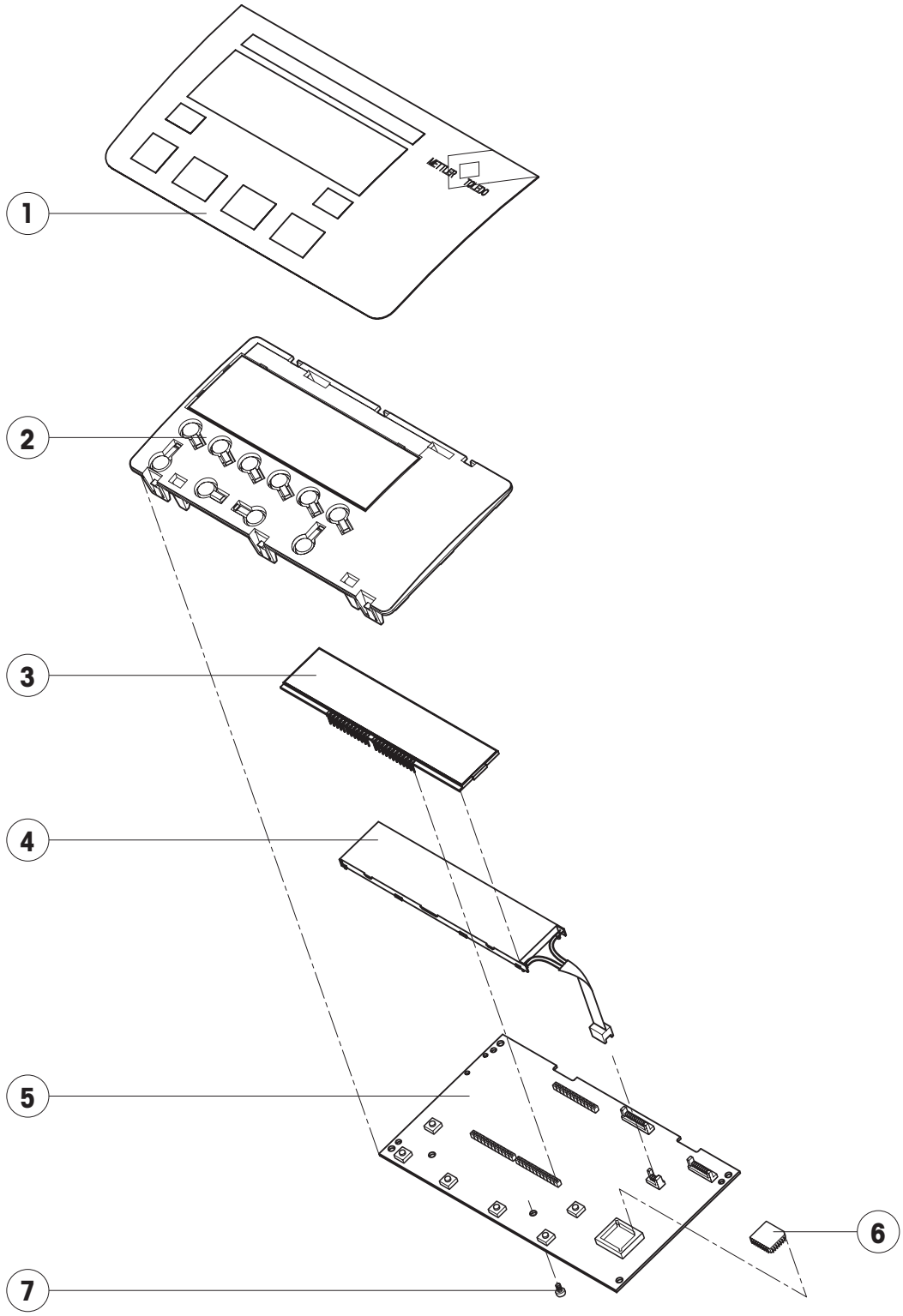
Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 1.7" (44 mm)/ M10 x 0.75 mm	21203109
2	6	countersunk Torx screw M4 x 10	*
3	1	bottom plate for small platform model	–
4	4	cylinder head Torx screw M4 x 12	*
5	4	flange washer 4.3 x 9	–
6	1	**weighing modules** (load cell and analog PCB):	
		weighing module 3002 Ex for 6 lb scale (3 kg)	21204011
		weighing module 6001 Ex for 12 lb scale (6 kg)	21204012
7	1	cell PCB cable Ex	21203990
8	1	wire harness Ex	21203732
9	2	spring clip *	21203166
10	1	analog PCB Viper Ex MonoBloc	21203576
11	1	grounding screw EX	21050066
12	1	A/D cable 4.3" (110 mm), for small platform model	21203164
13	2	connection cable Ex 4 pins, for small platform model	21203852
14	1	connector plate Ex	–
15	4	raised cheese head Torx screw M4 x 6	*
16	2	raised cheese head Torx screw M4 x 8 with tooth lock washer	–
17	1	level bubble	11101335

* included in the fasteners set (chapter 3)

– not available as spare part

2 Display units

2.1 Viper M display unit (not including Ex version)



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper M small platform model	21203440
2	1	display mounting plate for Viper M (always order together with item 1)	21203120
3	1	LCD for Viper M	21203134
4	1	back-light unit for Viper M	21203136
5	1	**digital PCB Viper M** [1)]	
		VIPER DIG M digital PCB for scales with strain gauge load cell [2)]	21203098
		VIPER MB DIG digital PCB with FLASH Memory chip (soldered) for scales with MonoBloc load cell [3)]	21204025-MBM
6	1	EPROM with scale program for Viper M scales with strain gauge load cell	21203583
7	1	retaining screw	*

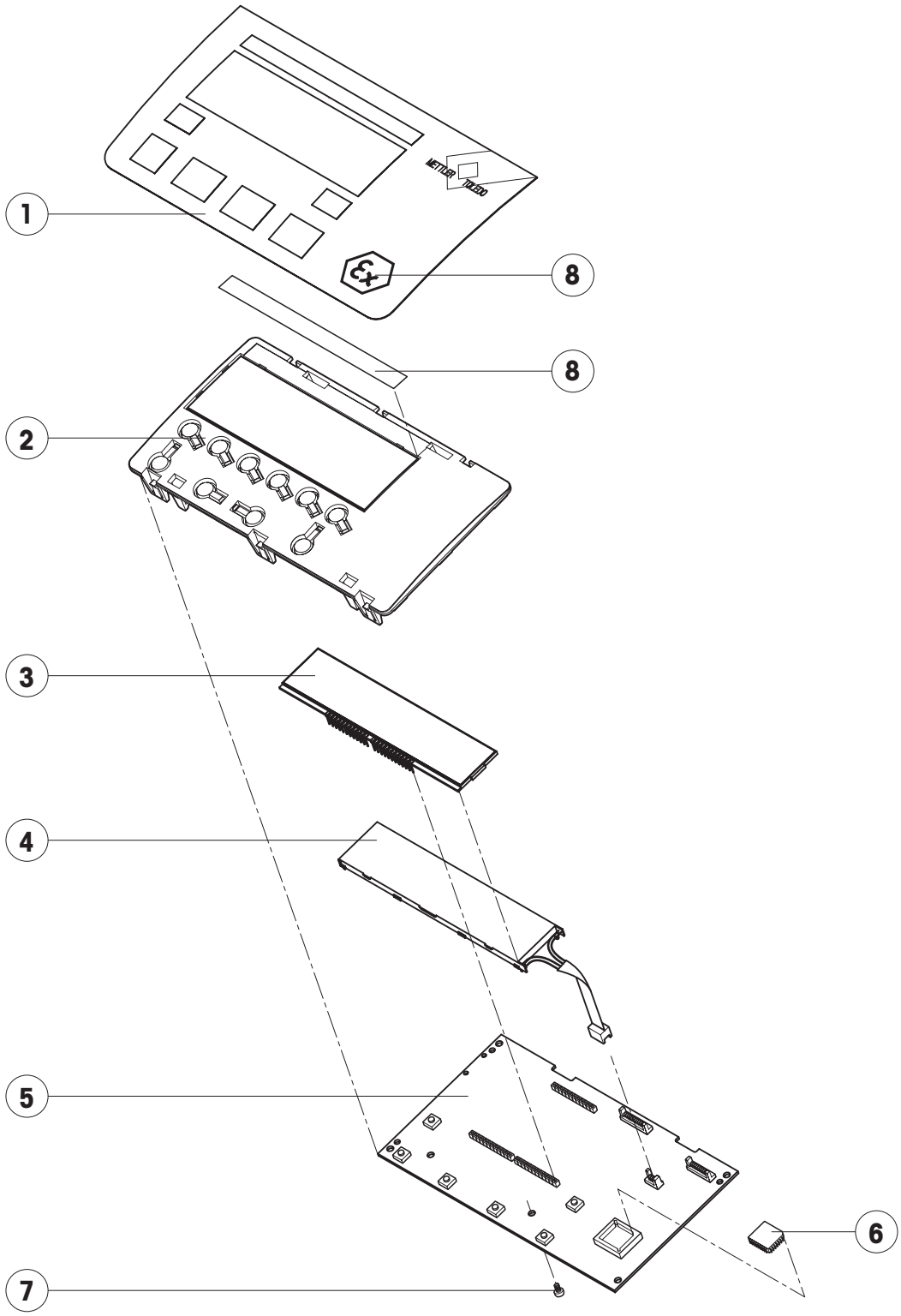
* included in the fasteners set (chapter 3)

1) without LCD and back-light unit (these parts must be ordered separately)

2) without EPROM (must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designation "MBM" following the order number specifies the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.2 Viper EX M display unit

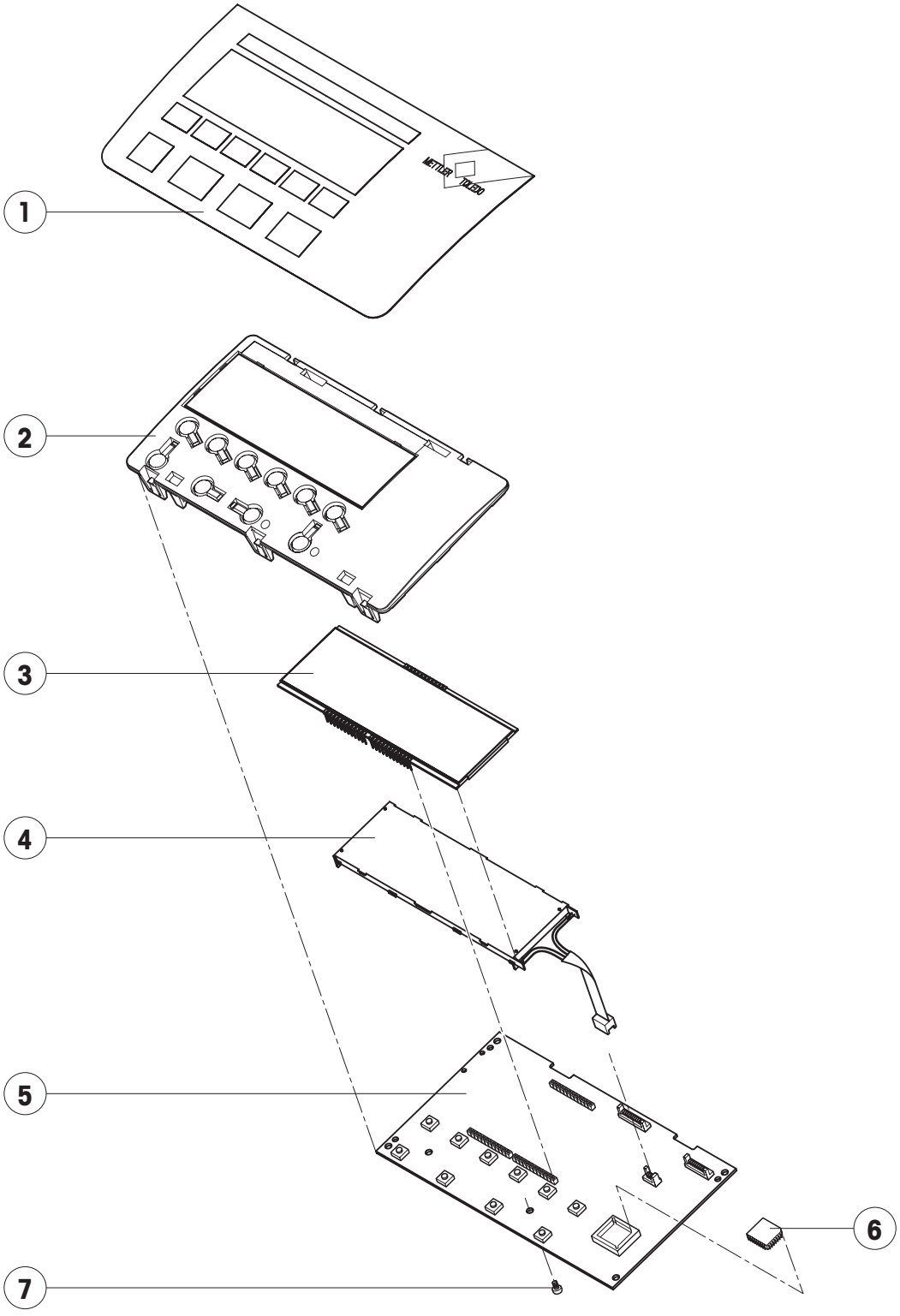


Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper M small platform model	21203440
2	1	display mounting plate for Viper Ex	21203734
3	1	LCD for Viper M	21203134
4	1	back-light unit for Viper M	21203136
5	1	VIPER Ex DIG digital PCB [1)]	21203593
6	1	**EPROM with scale program**:	
		EPROM for Viper M scales with strain gauge load cell	21203583
		EPROM for Viper M scales with MonoBloc load cell	21203584
7	1	retaining screw	*
8	1	set of blank labels Viper Ex	22007836

* included in the fasteners set (chapter 3)

[1)] supplied without software, LCD and back-light unit (these parts must be ordered separately)

2.3 Viper L display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper L small platform model	21203441
2	1	display mounting plate for Viper L (always order together with item 1)	21203491
3	1	LCD for Viper L/D	21203687
4	1	back-light unit for Viper L/D	21203137
5	1	**digital PCB Viper L** [1)]	
		VIPER DIG L digital PCB for scales with strain gauge load cell [2)]	21203097
		VIPER MB DIG digital PCB with FLASH Memory chip (soldered) for scales with MonoBloc load cell [3)]	21204025-MBL
6	1	EPROM with scale program for Viper L scales with strain gauge load cell	21203588
7	1	retaining screw	*

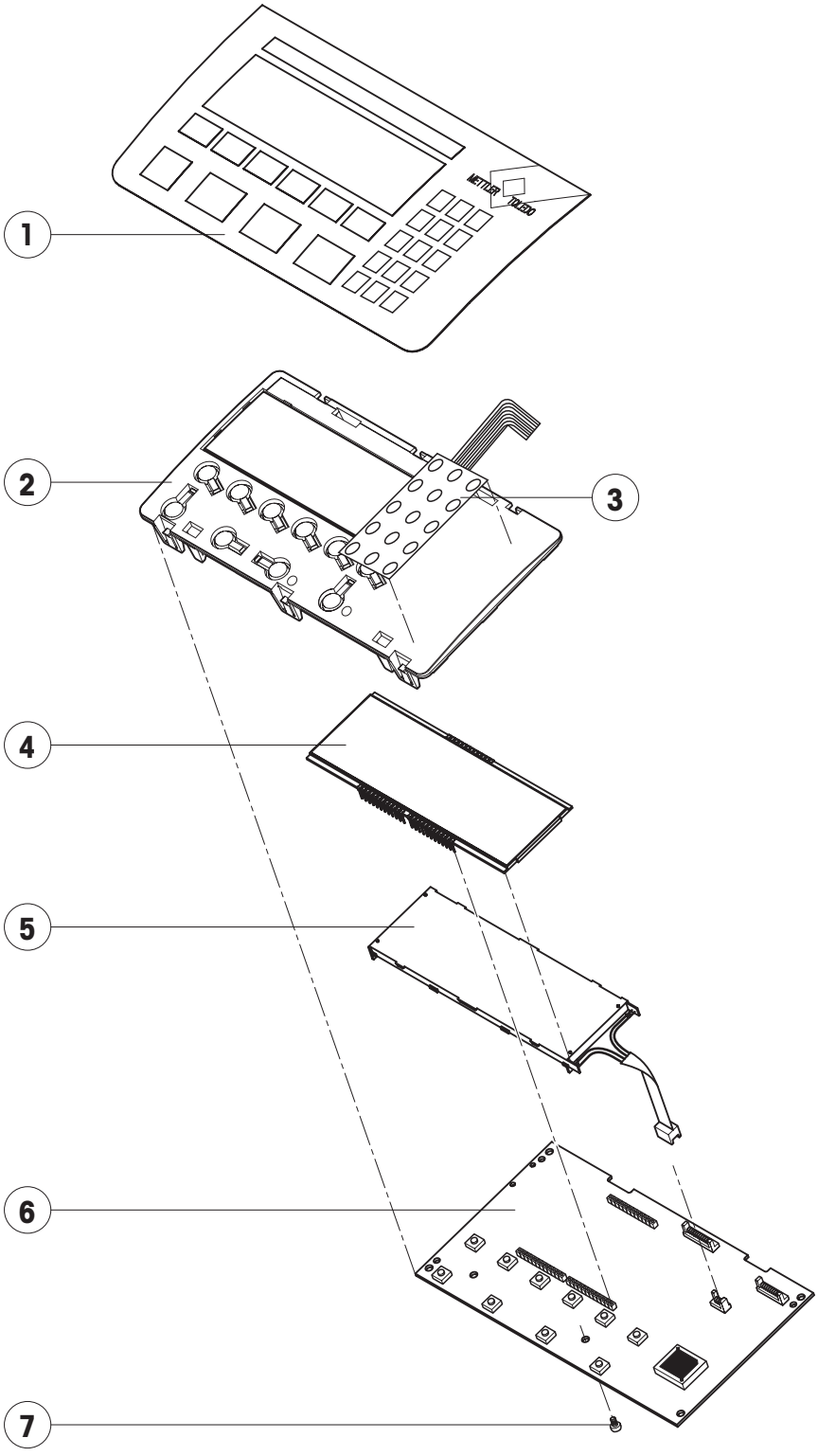
* included in the fasteners set (chapter 3)

1) without LCD and back-light unit (these parts must be ordered separately)

2) without EPROM (must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designation "MBL" following the order number specifies the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.4 Viper D display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper D small platform model	21203442
2	1	display mounting plate for Viper D (always order together with items 1 and 3)	21203448
3	1	pressure sensitive membrane for numeric keypad (15 keys) [1)]	21203439
4	1	LCD for Viper L/D	21203687
5	1	back-light unit for Viper L/D	21203137
6	1	**digital PCB Viper D** with FLASH Memory chip (soldered) [2)]	
		VIPER DIG D digital PCB for scales with strain gauge load cell [3)]	21203524-STD
		VIPER DIG D digital PCB for scales with MonoBloc load cell [3)]	21203524-MBD
7	1	retaining screw	*

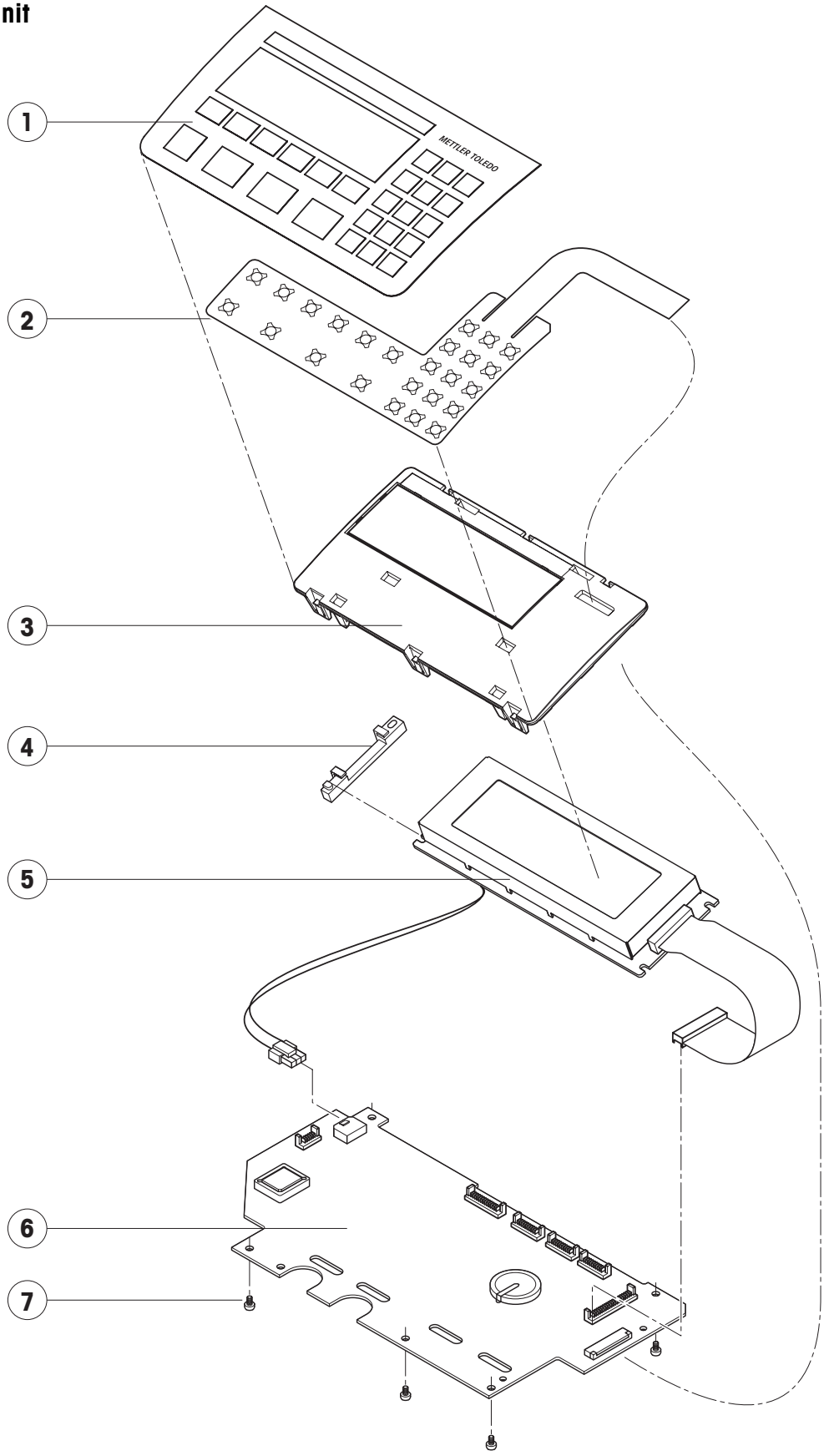
* included in the fasteners set (chapter 3)

1) always order together with item 1

2) supplied without LCD and back-light unit (these parts must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designations "STD" and "MBD" following the order number specify the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.5 Viper T display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper T small platform model	21203129
2	1	pressure sensitive keypad membrane for numeric keypad (25 keys)	21203501
3	1	display mounting plate for Viper T (always order together with items 1 and 2)	21203507
4	1	spacer plate	21255046
5	1	LCD module 240 x 64 dots CCFL	21203515
6	1	**digital PCB**:	
		Viper T (counting scale)	21203996
		SQC 16	21203772
		Smart Remote	21203997
7	5	retaining screw	*

* included in the fasteners set (chapter 3)

3 Fasteners set

The fasteners set comprises all the standard components (screws and washers) required for service work on Viper scales and terminals, plus the spring clips that hold the analog PCB in place.

Quantity	Description	Order No.
1	**fasteners set**:	21203404
20	countersunk Torx screw M3 x 8	–
20	countersunk Torx screw M3 x 10	–
20	countersunk Torx screw M6 x 30	–
50	countersunk Torx screw M4 x 10	–
10	countersunk Torx screw M4 x 12	–
20	button head Torx screw M3 x 6	–
30	button head Torx screw M4 x 12	–
30	button head Torx screw M5 x 12	–
20	wide flange washer 4.3 x 20	–
20	wide flange washer 5.3 x 20	–
20	countersunk Torx screw M6 x 16	–
20	spring clip	–
50	raised cheese head Torx screw M4 x 6	–
10	screw lock	–
10	Torx oval head tapping screw 2.9 x 13	–

Section 3

Viper scales with large platform

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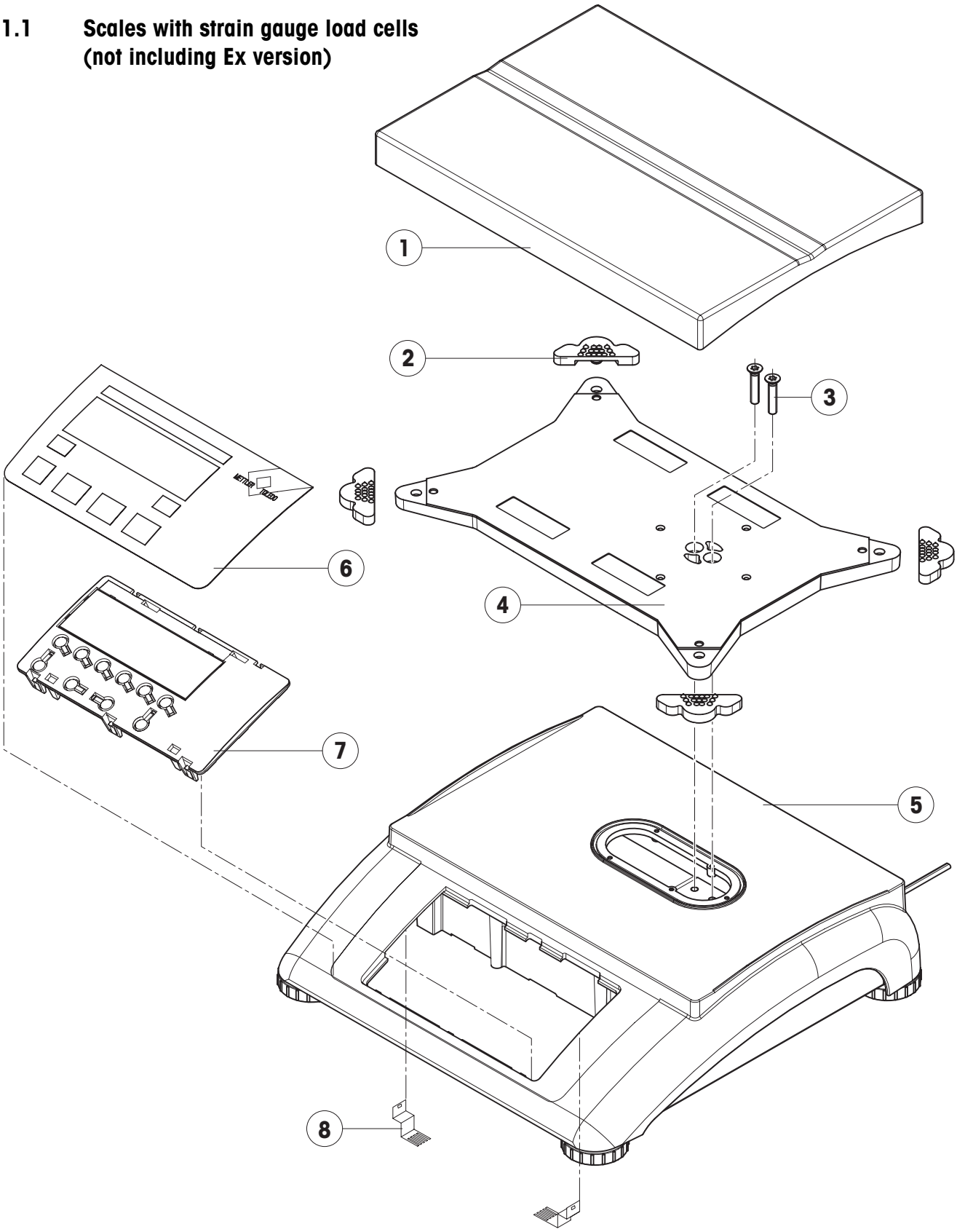
Repair: see Section 5

1 Scales

1.1 Scales with strain gauge load cells (not including Ex version)



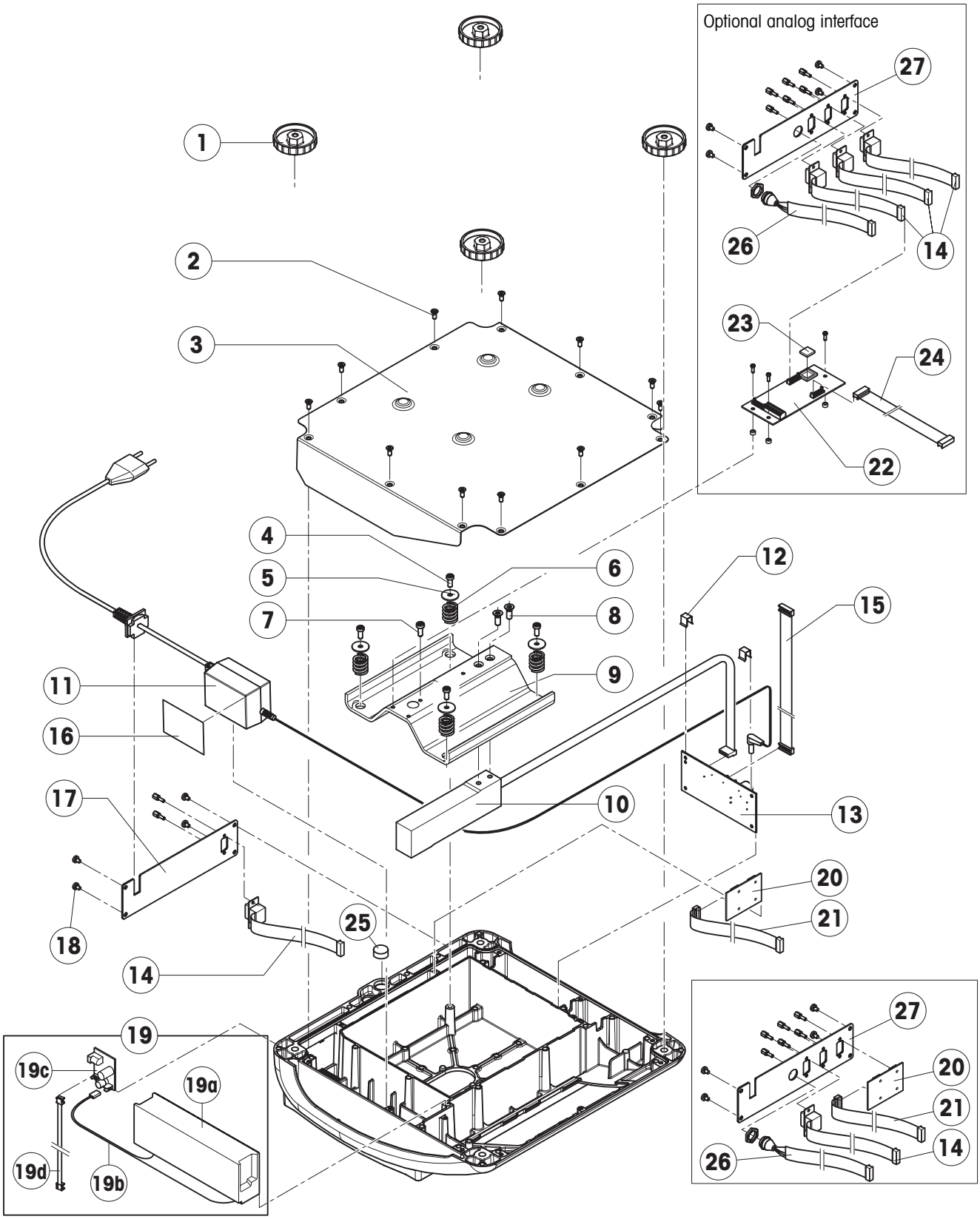
Item	Quantity	Description	Order No.
1	1	platter 9.5" x 13.8" (240 x 350 mm)	21203072
2	4	rubber cushion (1 piece) [1)]	21203073
3	2	countersunk Torx screw M6 x 30	*
4	1	pan support plate 9.5" x 13.8" (240 x 350 mm)	21203075
5	1	housing, VIPER with large platform	–
6	1	keypad overlay	Subsection 2
7	1	mounting plate and display unit (digital PCB with LCD and back-light unit)	Subsection 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

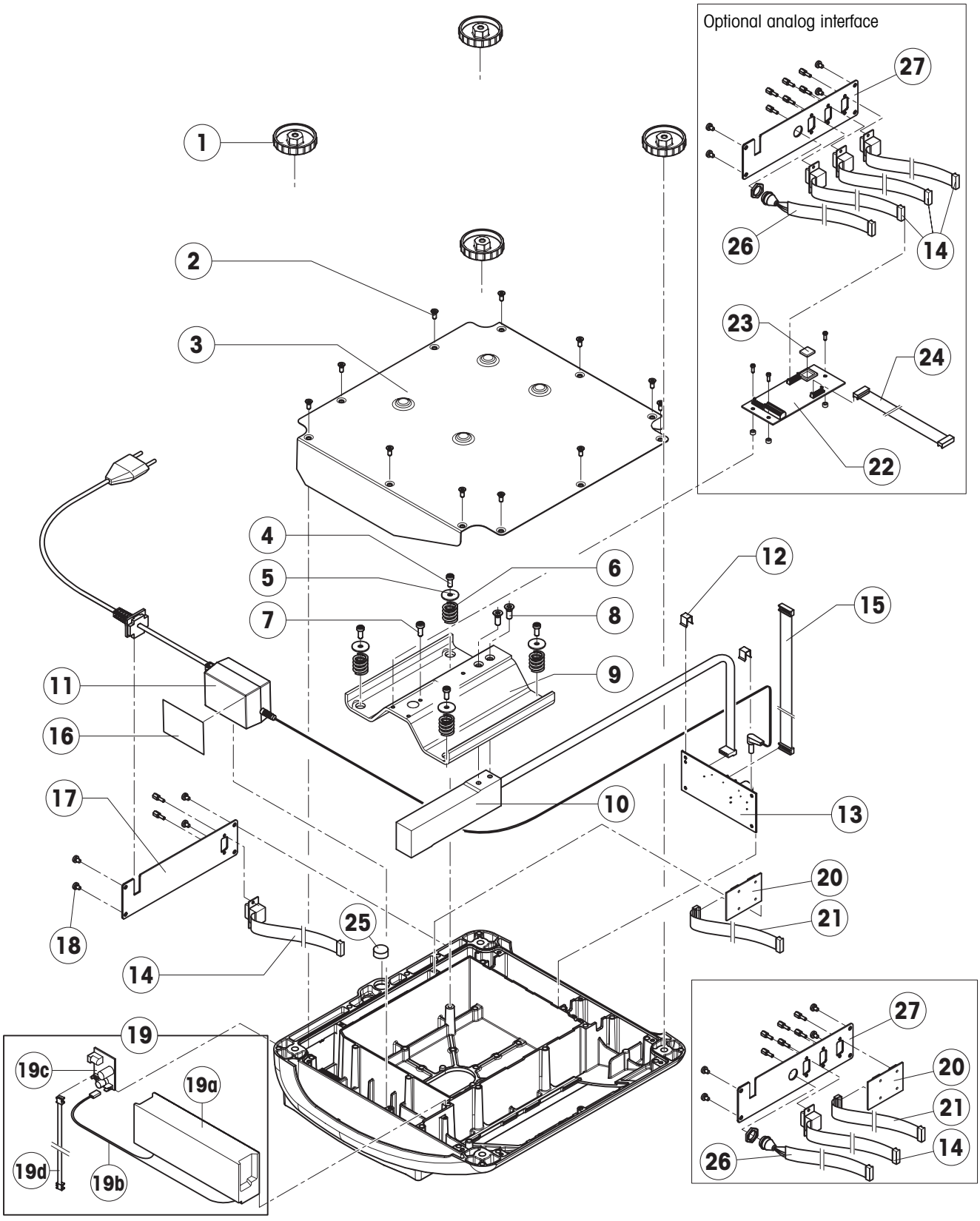
[1)] New rubber cushions have a hole in the surface to assist with assembly. A pin can be used to insert the cushion into the corresponding drilled hole in the pan support plate. Earlier rubber cushions did not have this assembly aid.

Scales with strain gauge load cells (continued)



Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 2.2" (55 mm)/M10 x 0.75 mm	21203110
2	11	countersunk Torx screw M4 x 10	*
3	1	bottom plate for large platform model	–
4	4	button head Torx screw M5 x 12	*
5	4	wide flange washer 5.3 x 20	*
6	4	overload spring	**
7	1	overload stop adjustment screw (with specific production series only)	**
8	2	countersunk Torx screw M6 x 16	*
9	1	overload plate for large platform model	–
10	1	**load cell with cable** (certifiable) (**Note**: only "LC..." load cells are available as spare parts!)	
		Weighing range 24 lb (12 kg): C20MRL **or** LC0785-20-MRV	(21203151) **21203885**
		Weighing range 75 lb (30 kg): C50MRL **or** LC0785-50-MRV	(21203152) **21203886**
		Weighing range 120 lb (60 kg): C100MRL **or** LC0785-100-MRV	(21203153) **21203887**
11	1	**bench AC adapter**:	
		US version, internal (always order together with item 16)	21203122
		US version **for scales with rechargeable battery and Viper T scales**	21255102
12	2	spring clip *	21203166
13	1	analog PCB Viper DMS	21203092
14	1	RS cable 18.1" (460 mm)	21203168
15	1	A/D cable 11.8" (300 mm) for large platform model	21203167
16	1	adhesive patch for AC adapter or battery	21203184
17	1	RS connector plate for Viper M/L/D (various types, depending on the equipment)	–
18	4	raised cheese head Torx screw M4 x 6	*
19		**For scales with with rechargeable battery only**:	
19a	1	rechargeable battery 12V/2,2Ah (always order together with item 16)	21203232
19b	1	battery cable (charging PCB – battery)	21203231
19c	1	charging circuit print	21204033
19d	1	connection cable (charging PCB – analog PCB)	21203233

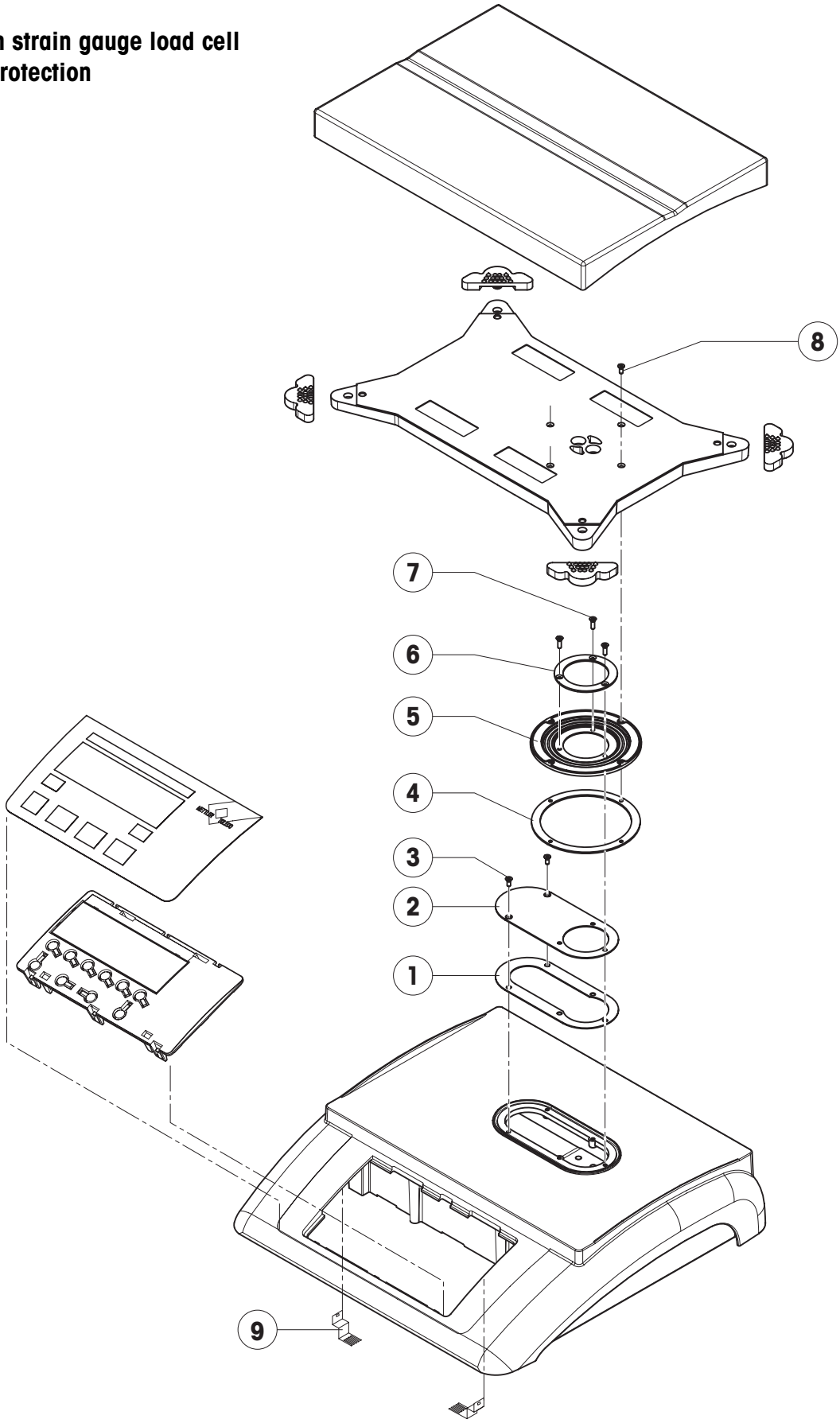
Scales with strain gauge load cells (continued)



20	1	PCB RS option (2 x RS232C), standard with Viper T	21203476
21	1	connection cable RS option 15" (380 mm)	21203490
22	1	PCB optional analog interface	21203383
23	1	**EPROM with interface software (for optional analog interface)**	
		EPROM for Viper L and D analog interface	21203915
		EPROM for Viper T analog interface	21255318
24	1	connection cable for optional analog interface 9.9" (250 mm)	21203604
25	1	level bubble	21203204
26	1	PS2 cable 18.1"/460 mm, (keyboard connection, for Viper T only)	21204107
27	1	connector plate Viper T for 3 RS interfaces and 1 keyboard cable: standard scale: 1x PCB RS Option, 1x RS cable 18.1", 1x PS2 cable scale with optional analog interface: 3x RS cable 18.1", 1x PS2 cable	–

* included in the fasteners set (chapter 3) ** see section 4 "Replacing the load cell" – not available as spare part

1.2 Scales with strain gauge load cell and IP65 protection



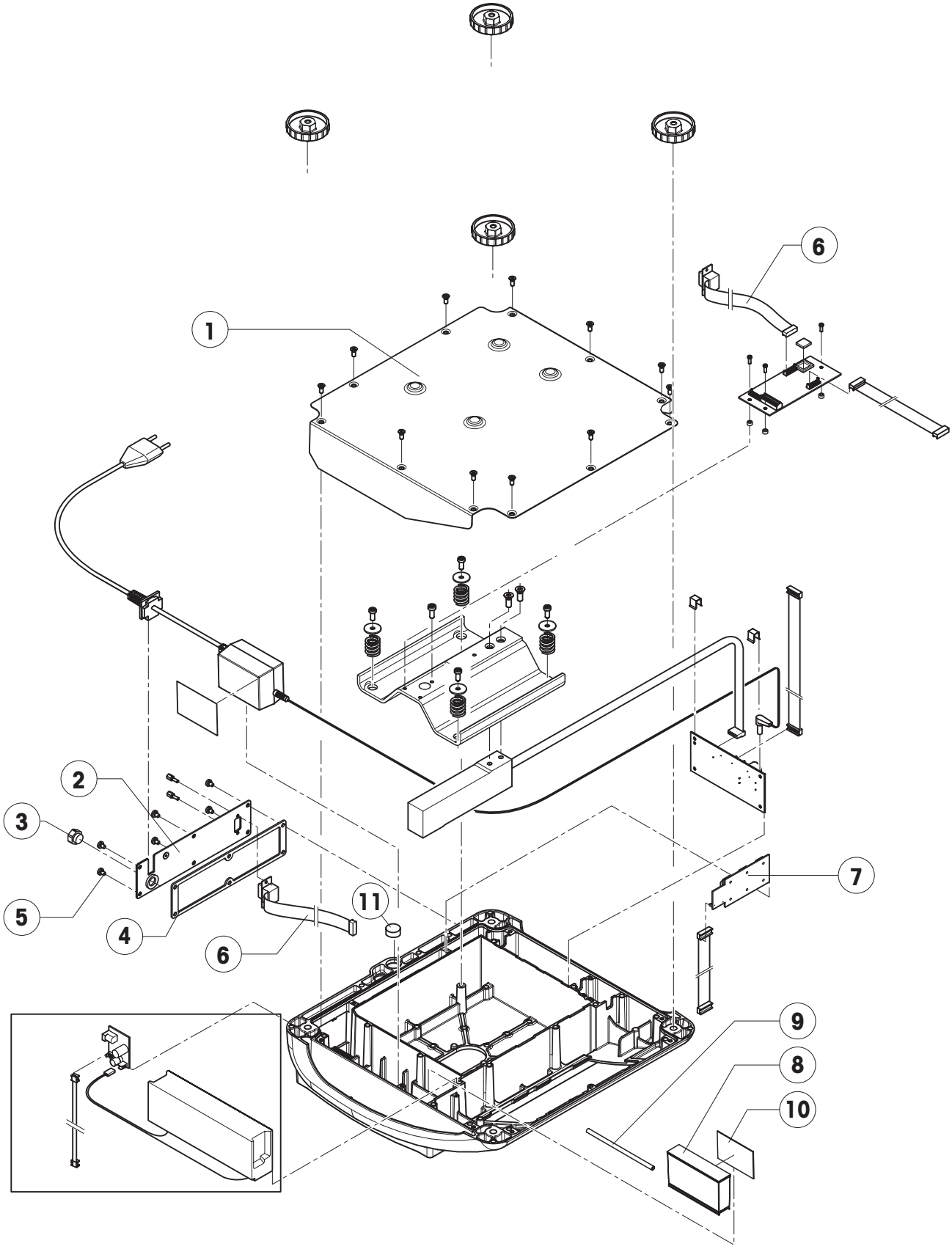
Item	Quantity	Description	Order No.
1	1	packing for cover plate	21203235
2	1	cover plate	–
3	2	countersunk Torx screw M3 x 8	*
4	1	flange D = 100 mm	–
5	1	diaphragm	21203077
6	1	flange D = 58 mm	–
7	3	countersunk Torx screw M3 x 10	*
8	4	countersunk Torx screw M3 x 8	*
9	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Note: Parts of the scale not numbered in the illustration are included in the normal version (chapter 1.1).

Scales with strain gauge load cells and IP65 protection (continued)



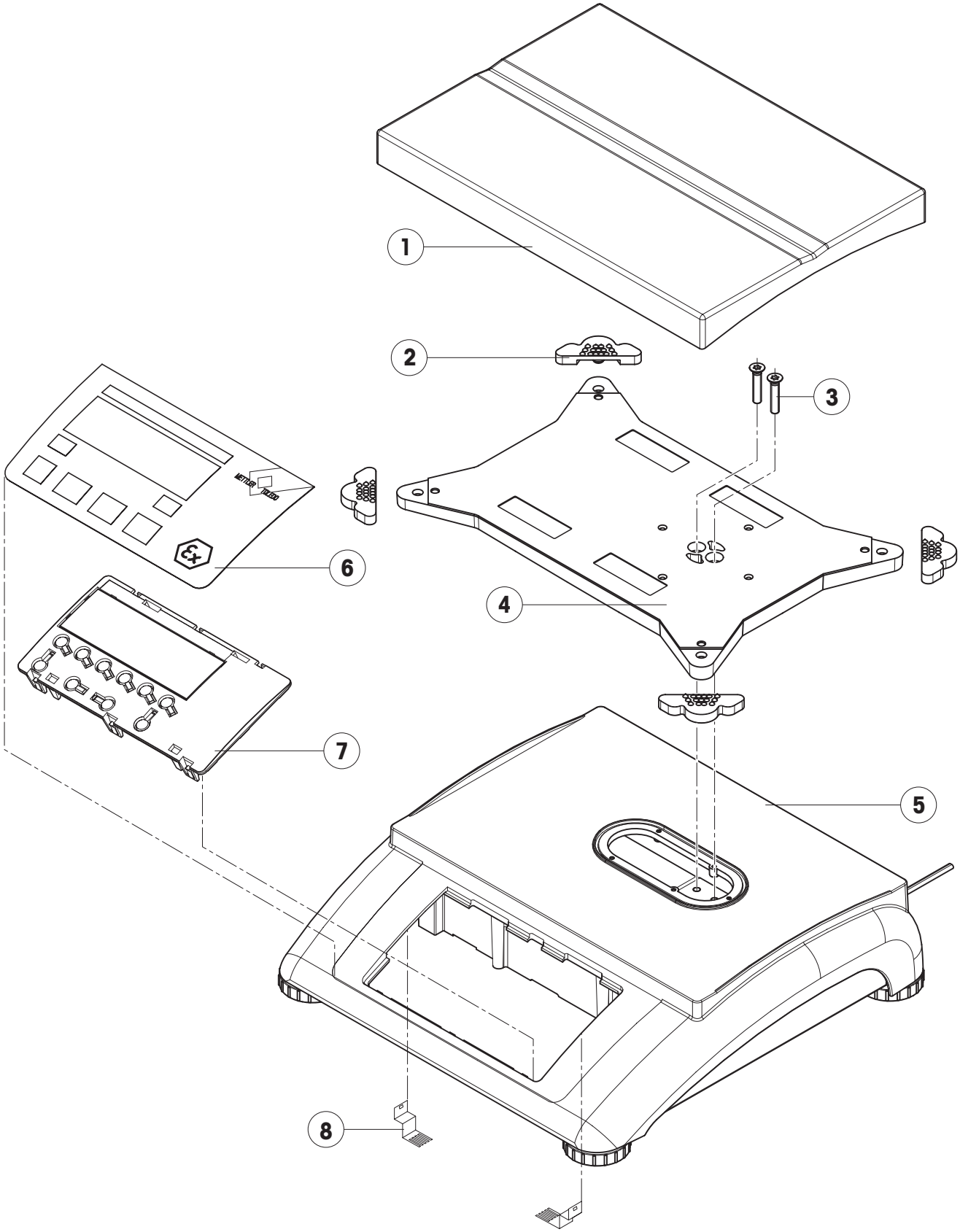
Item	Quantity	Description	Order No.
1	1	bottom plate for large platform model IP65 version	21203512
2	1	RS connector plate IP65 version (various types, depending on the equipment)	–
3	1	air supply/extraction filter	21203860
4	1	packing for RS connector plate	21203236
5	6	raised cheese head Torx screw M4 x 6	*
6	1	RS cable 460 mm IP65	21203717
7	1	PCB RS option (2 x RS232C) IP65	21255081
8	1	pressure equalizer	21203611
9	1	pressure equalizer tube LA	21203862
10	1	adhesive patch for pressure equalizer	21203184
11	1	level bubble	21203204

* included in the fasteners set (chapter 3)

– not available as spare part

Note: Parts of the scale not numbered in the illustration are included in the normal version (chapter 1.1).

1.3 Scales with strain gauge load cells, Ex version



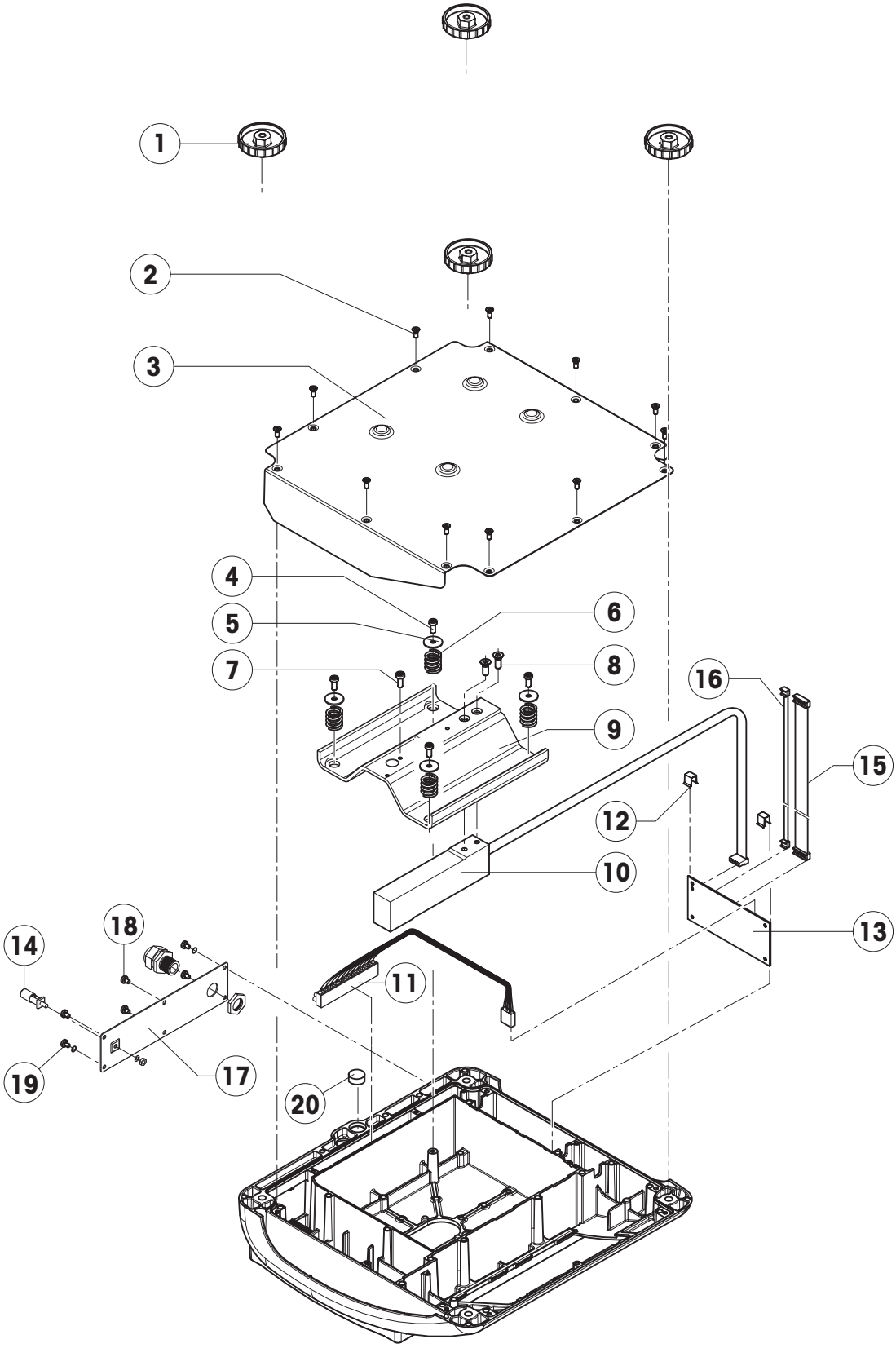
Item	Quantity	Description	Order No.
1	1	platter 9.5" x 13.8" (240 x 350 mm)	21203072
2	4	rubber cushion (1 piece) [1)]	21203073
3	2	countersunk Torx screw M6 x 30	*
4	1	pan support plate 9.5" x 13.8" (240 x 350 mm)	21203075
5	1	housing, VIPER with large platform	–
6	1	keypad overlay	Subsection 2
7	1	mounting plate and display unit (digital PCB with LCD and back-light unit)	Subsection 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

[1)] New rubber cushions have a hole in the surface to assist with assembly. A pin can be used to insert the cushion into the corresponding drilled hole in the pan support plate. Earlier rubber cushions did not have this assembly aid.

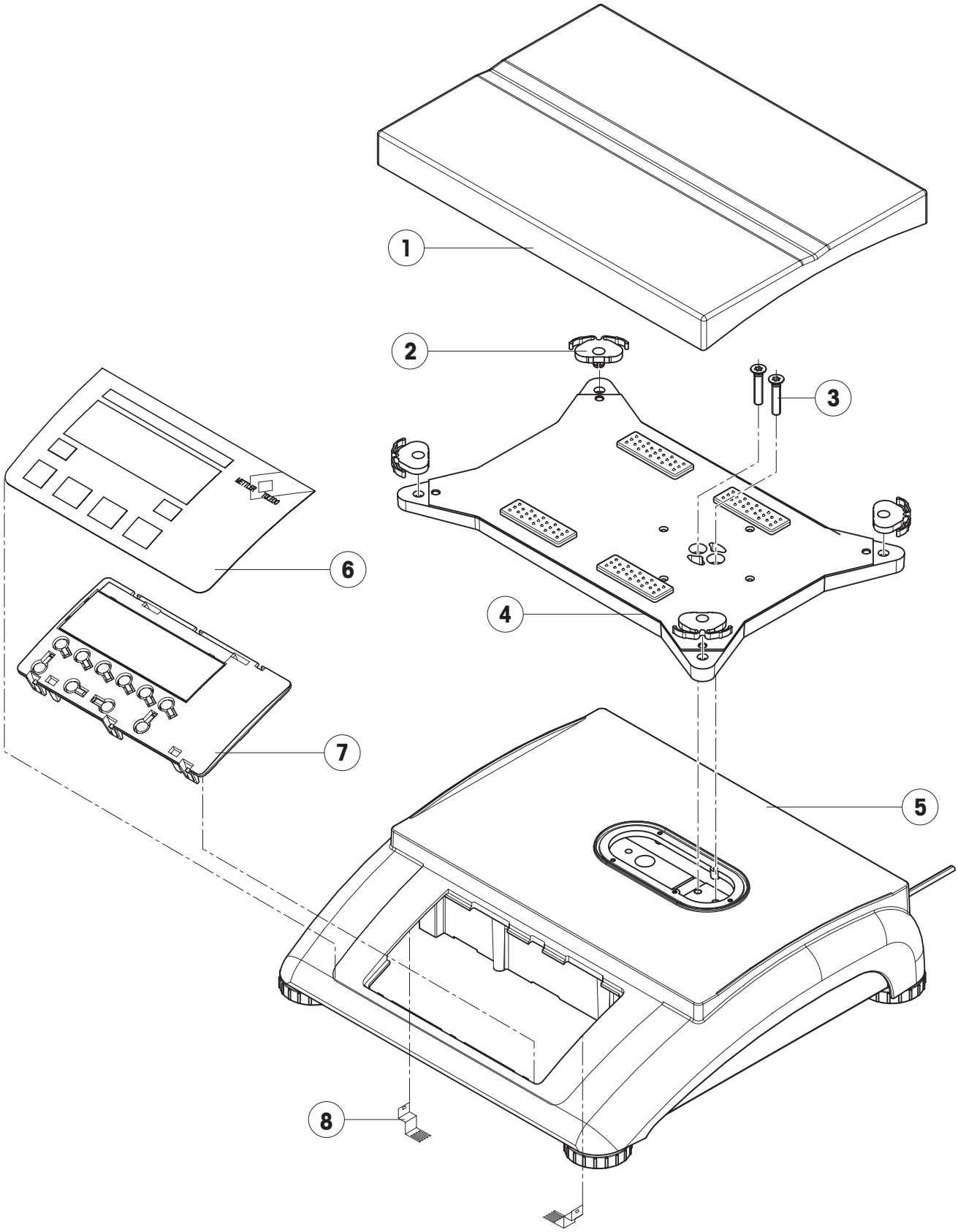
Scales with strain gauge load cells, Ex version (continued)



Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 2.2" (55 mm)/M10 x 0.75 mm	21203110
2	11	countersunk Torx screw M4 x 10	*
3	1	bottom plate for large platform model	–
4	4	button head Torx screw M5 x 12	*
5	4	wide flange washer 5.3 x 20	*
6	4	overload spring	**
7	1	overload stop adjustment screw (with specific production series only)	**
8	2	countersunk Torx screw M6 x 16	*
9	1	overload plate for large platform model	–
10	1	**load cell with cable** (certifiable)	
		Weighing range 24 lb (12 kg): LC0785-20-MRV	21203885
		Weighing range 75 lb (30 kg): LC0785-50-MRV	21203886
		Weighing range 120 lb (60 kg): LC0785-100-MRV	21203887
11	1	wire harness Ex	21203732
12	2	spring clip *	21203166
13	1	analog PCB Viper Ex DMS	21203577
14	1	grounding screw EX	21050066
15	1	A/D cable 11.8" (300 mm) for large platform model	21203167
16	1	connection cable Ex 4 pins, for large platform model	21203733
17	1	connector plate Ex	–
18	4	raised cheese head Torx screw M4 x 6	*
19	2	raised cheese head Torx screw M4 x 8 with tooth lock washer	–
20	1	level bubble	21203204

* included in the fasteners set (chapter 3) ** see section 4 "Replacing the load cell" – not available as spare part

1.4 Scales with MonoBloc load cells (not including Ex version)

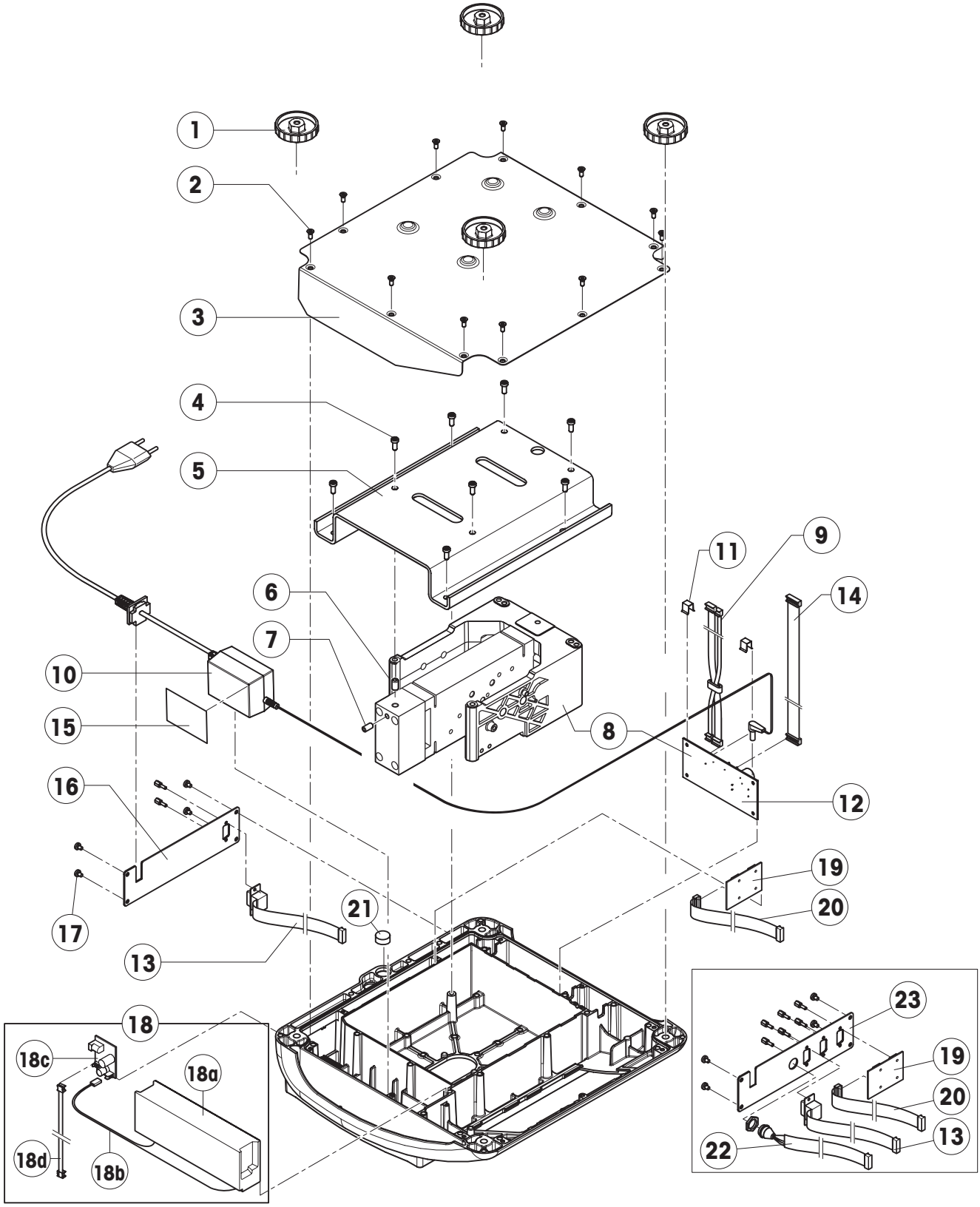


Item	Quantity	Description	Order No.
1	1	platter 9.5" x 13.8" (240 x 350 mm)	21203072
2	4	pan mount (rubber cushion)	21203238
3	2	countersunk screw M6 x 30	*
4	1	load plate support 9.5" x 13.8" (240 x 350 mm)	–
5	1	housing VIPER with large platform	–
6	1	keypad overlay	Chapter 2
7	1	mounting plate and display unit (digital PCB and display compl.)	Chapter 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Scales with MonoBloc load cells (continued)

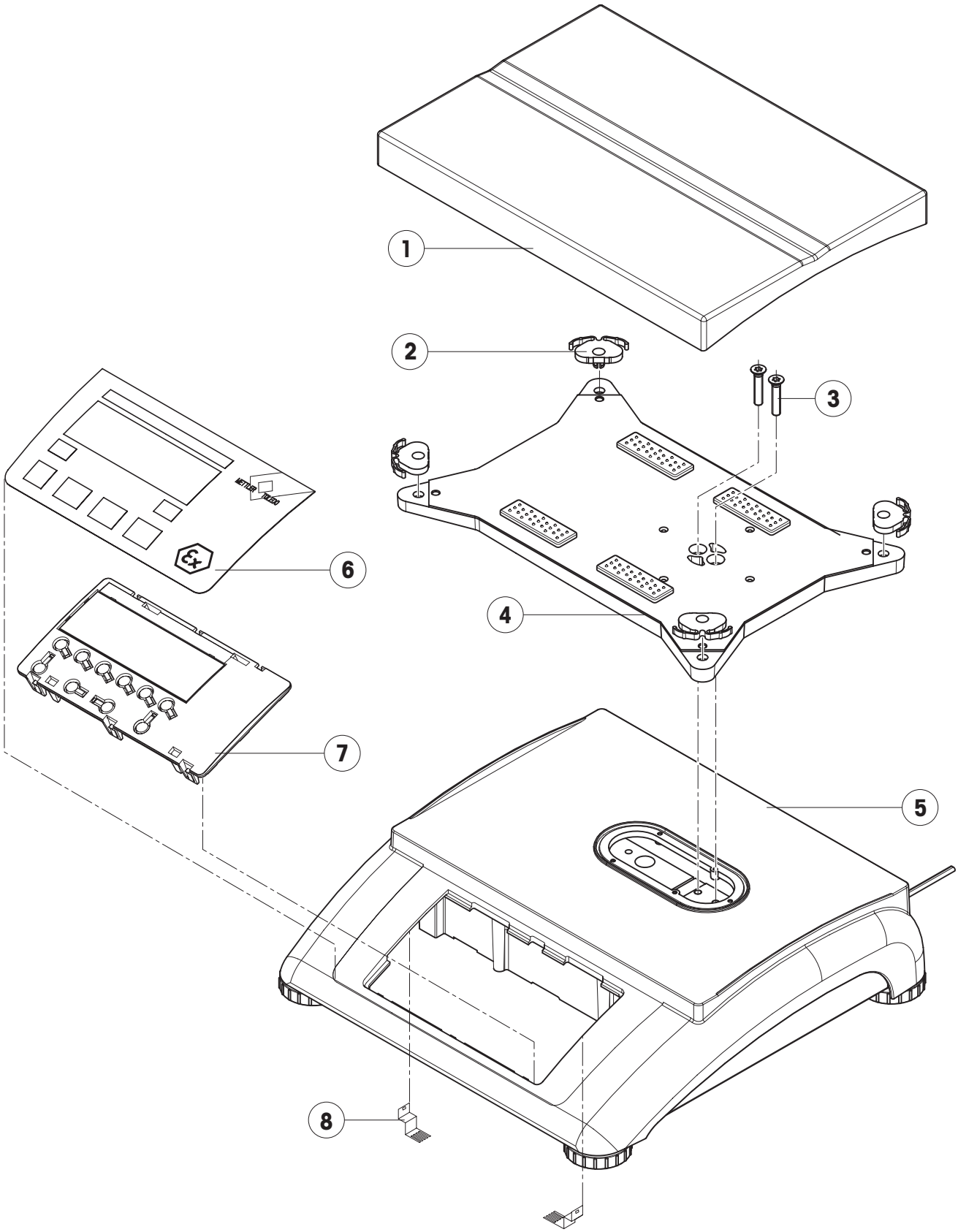


Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 2.2" (55 mm)/M10 x 0.75 mm	21203110
2	11	countersunk Torx screw M4 x 10	*
3	1	bottom plate for large platform model	–
4	8	cylinder head Torx screw M5 x 12	*
5	1	overload plate	–
6	1	overload stop: adjustment screw	–
7	1	overload stop: arrestment screw	–
8	1	**weighing modules** (load cell and analog PCB):	
		weighing module 32001 for 24 lb and 75 lb scales (12 kg and 30 kg)	11102687
9	1	cell cable MB-LA with ferrite ring	21203290
10	1	**bench AC adapter**:	
		US version, internal (always order together with item 15)	21203122
		US version **for scales with rechargeable battery and Viper T scales**	21255102
11	2	spring clip *	21203166
12	1	analog PCB Viper MonoBloc	21203100
13	1	RS cable 18.1" (460 mm)	21203168
14	1	A/D cable 11.8" (300 mm), for large platform model	21203167
15	1	adhesive patch for AC adapter or battery	21203184
16	1	RS connector plate for Viper M/L/D (various types, depending on the equipment)	–
17	4	raised cheese head Torx screw M4 x 6	*
18		**For scales with rechargeable battery only**:	
18a	1	rechargeable battery 12V/2,2Ah (always order together with item 15)	21203232
18b	1	battery cable (charging PCB – battery)	21203231
18c	1	charging circuit print	21204033
18d	1	connection cable (charging PCB – analog PCB)	21203233
19	1	PCB RS option (2 x RS232C), standard with Viper T	21203476
20	1	connection cable RS option 15" (380 mm)	21203490
21	1	level bubble	11101335
22	1	PS2 cable 18.1"/460 mm, (keyboard connection, for Viper T only)	21204107
23	1	connector plate Viper T for 3 RS interfaces and 1 keyboard cable (1x PCB RS Option, 1x RS cable 18.1", 1x PS2 cable)	–

* included in the fasteners set (chapter 3)

– not available as spare part

1.5 Scales with MonoBloc load cells, Ex version

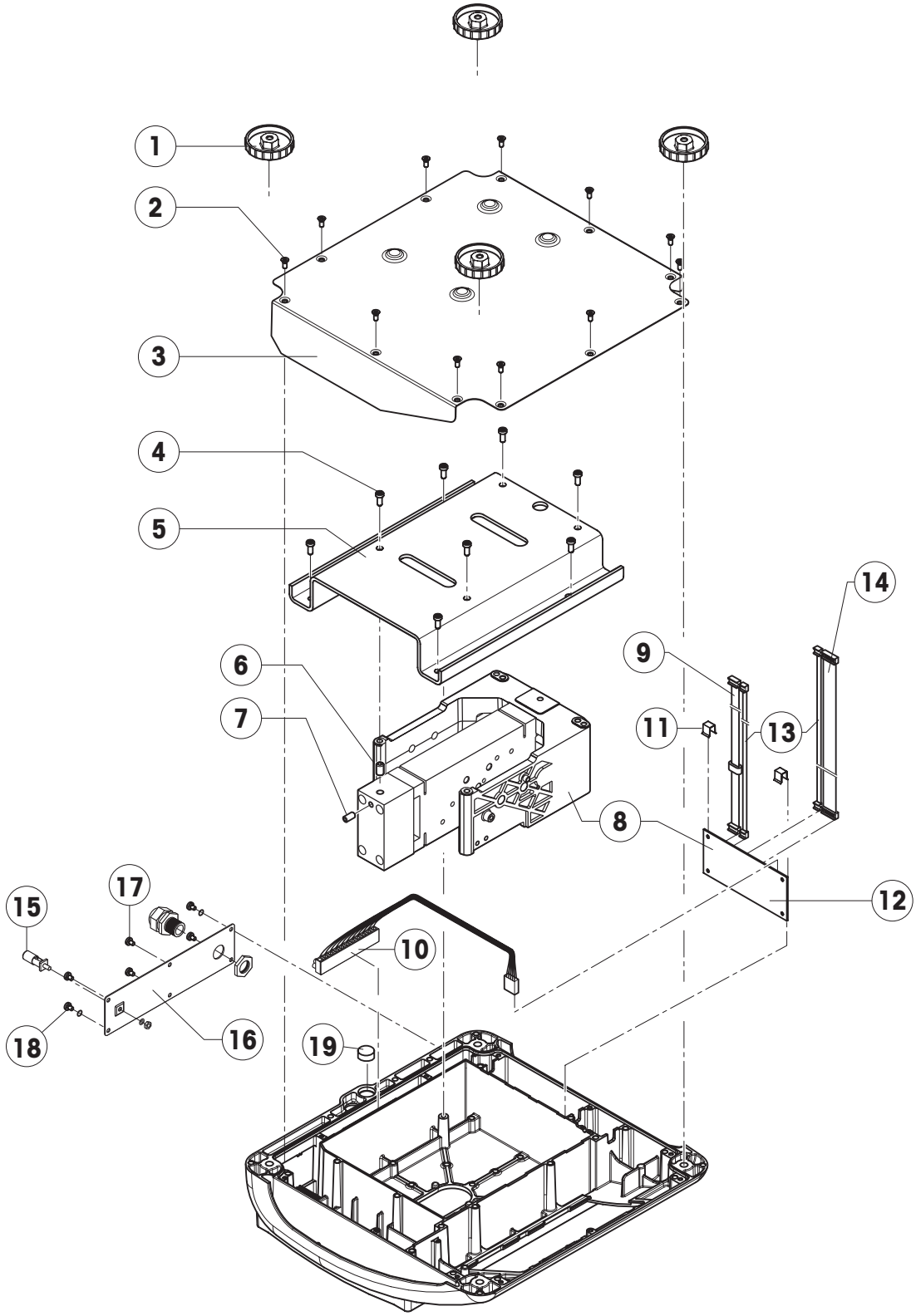


Item	Quantity	Description	Order No.
1	1	platter 9.5" x 13.8" (240 x 350 mm)	21203072
2	4	pan mount (rubber cushion)	21203238
3	2	countersunk screw M6 x 30	*
4	1	load plate support 9.5" x 13.8" (240 x 350 mm)	–
5	1	housing VIPER with large platform	–
6	1	keypad overlay	Chapter 2
7	1	mounting plate and display unit (digital PCB and display compl.)	Chapter 2
8	2	EMC clamp	21203480

* included in the fasteners set (chapter 3)

– not available as spare part

Scales with MonoBloc load cells, Ex version (continued)



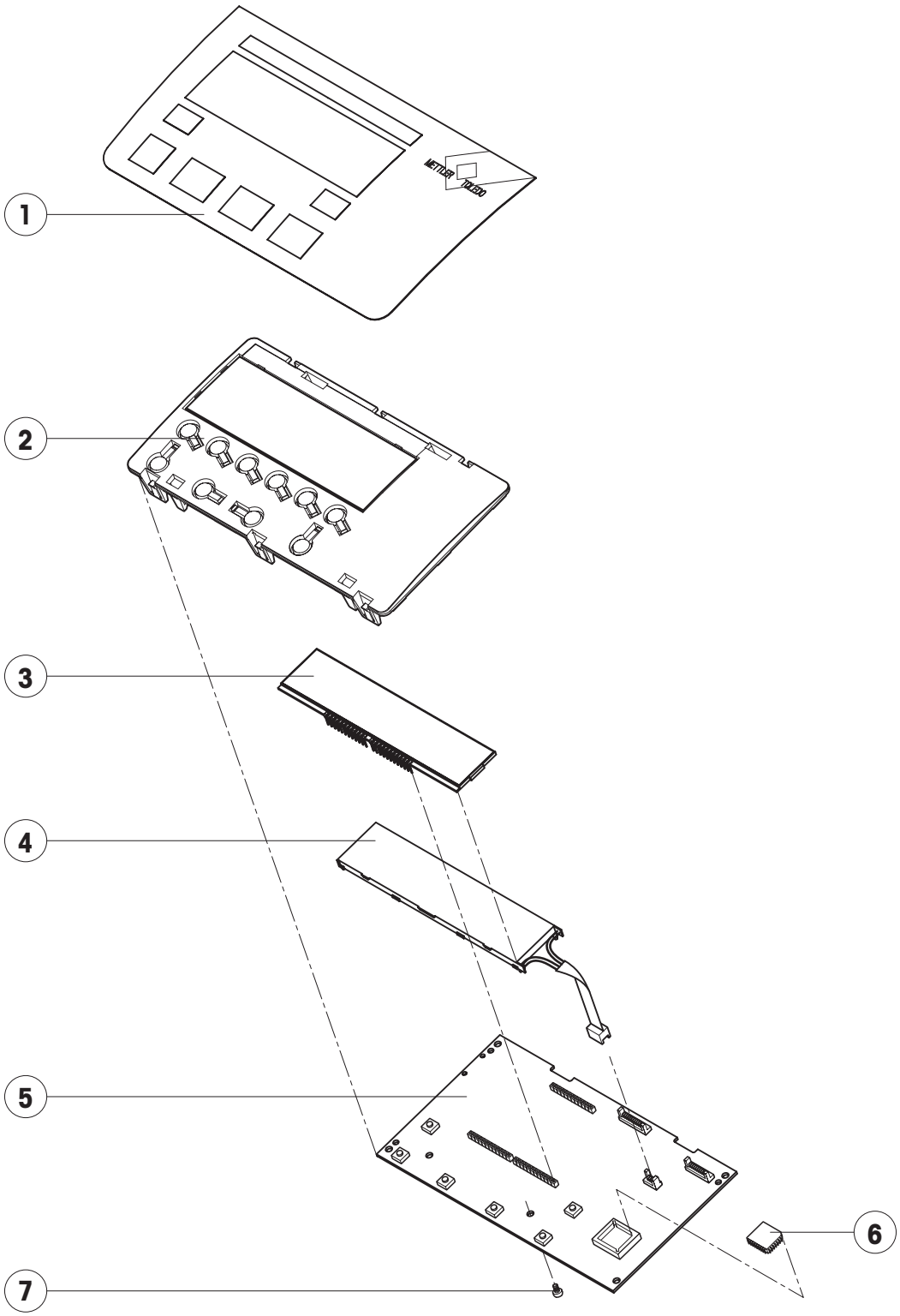
Item	Quantity	Description	Order No.
1	4	adjustable foot ∅ 2.2" (55 mm)/M10 x 0.75 mm	21203110
2	11	countersunk Torx screw M4 x 10	*
3	1	bottom plate for large platform model	–
4	8	cylinder head Torx screw M5 x 12	*
5	1	overload plate	–
6	1	overload stop: adjustment screw	–
7	1	overload stop: arrestment screw	–
8	1	**weighing modules** (load cell and analog PCB):	
		weighing module 32001 Ex for 24 lb and 75 lb scales (12 kg and 30 kg)	21204013
9	1	cell PCB cable Ex, for large platform model	21203851
10	1	wire harness Ex	21203732
11	2	spring clip *	21203166
12	1	analog PCB Viper Ex MonoBloc	21203576
13	2	connection cable Ex 4 pins, for large platform model	21203733
14	1	A/D cable 11.8" (300 mm), for large platform model	21203167
15	1	grounding screw EX	21050066
16	1	connector plate Ex	–
17	4	raised cheese head Torx screw M4 x 6	*
18	2	raised cheese head Torx screw M4 x 8 with tooth lock washer	–
19	1	level bubble	11101335

* included in the fasteners set (chapter 3)

– not available as spare part

2 Display units

2.1 Viper M display unit (not including Ex version)



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper M large platform model	21203443
2	1	display mounting plate for Viper M (always order together with item 1)	21203120
3	1	LCD for Viper M	21203134
4	1	back-light unit for Viper M	21203136
5	1	**digital PCB Viper M** [1)]	
		VIPER DIG M digital PCB for scales with strain gauge load cell [2)]	21203098
		VIPER MB DIG digital PCB with FLASH Memory chip (soldered) for scales with MonoBloc load cell [3)]	21204025-MBM
6	1	EPROM with scale program for Viper M scales with strain gauge load cell	21203583
7	1	retaining screw	*

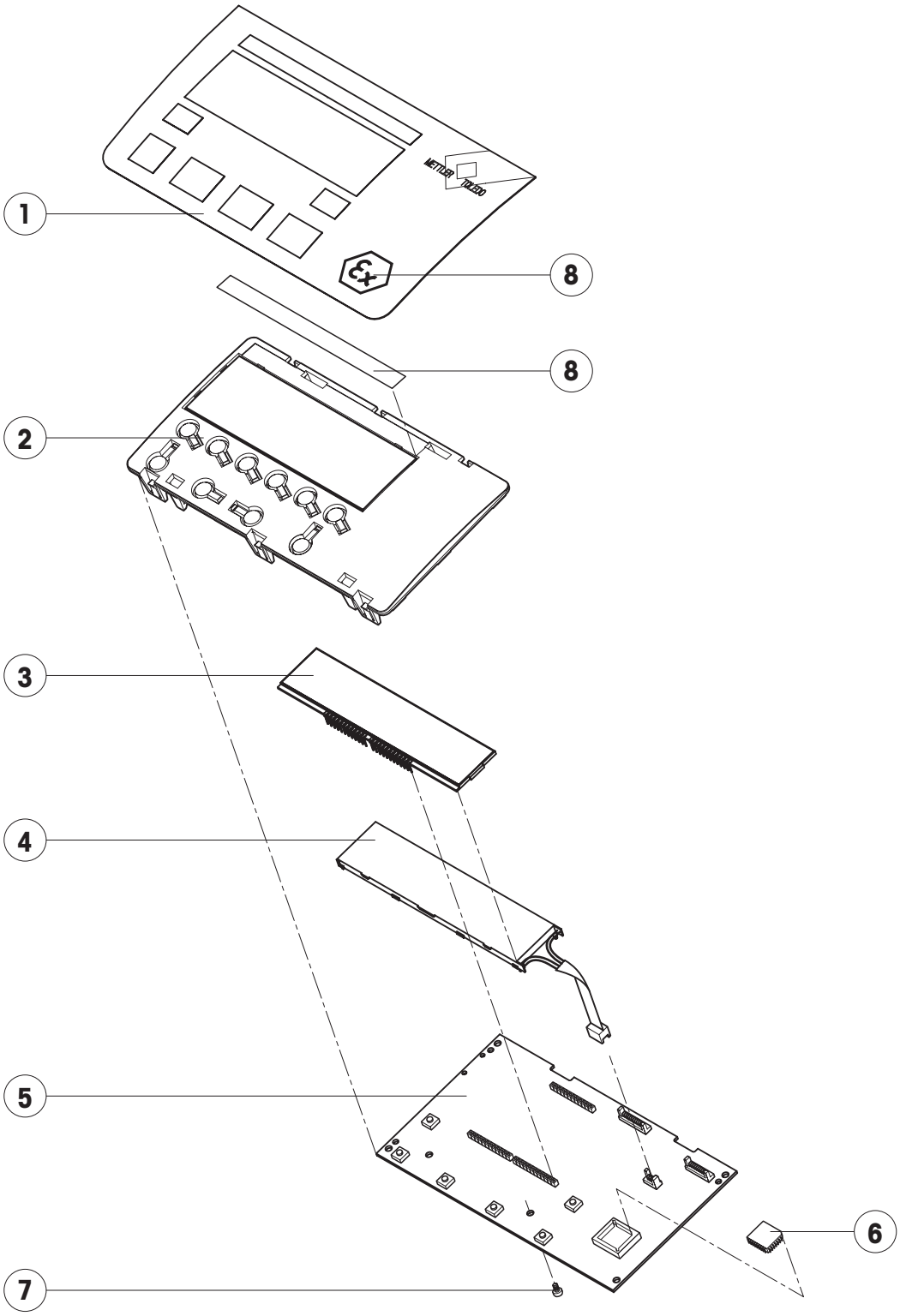
* included in the fasteners set (chapter 3)

1) without LCD and back-light unit (these parts must be ordered separately)

2) without EPROM (must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designation "MBM" following the order number specifies the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.2 Viper EX M display unit

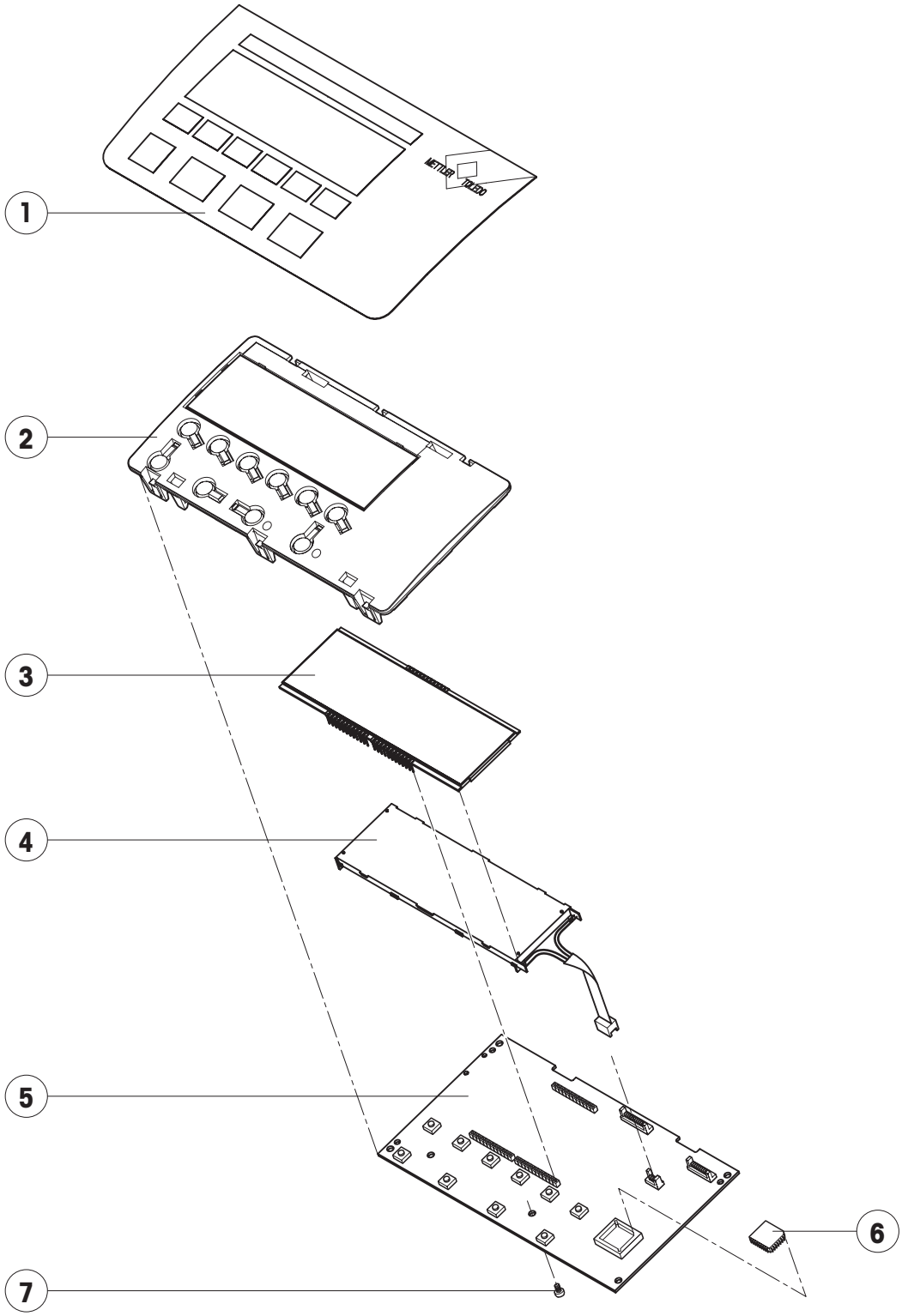


Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper M large platform model	21203443
2	1	display mounting plate for Viper Ex	21203734
3	1	LCD for Viper M	21203134
4	1	back-light unit for Viper M	21203136
5	1	VIPER Ex DIG digital PCB [1)]	21203593
6	1	**EPROM with scale program**:	
		EPROM for Viper M scales with strain gauge load cell	21203583
		EPROM for Viper M scales with MonoBloc load cell	21203584
7	1	retaining screw	*
8	1	set of blank labels Viper Ex	22007836

* included in the fasteners set (chapter 3)

[1)] supplied without software, LCD and back-light unit (these parts must be ordered separately)

2.3 Viper L display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper L large platform model	21203444
2	1	display mounting plate for Viper L (always order together with item 1)	21203491
3	1	LCD for Viper L/D	21203687
4	1	back-light unit for Viper L/D	21203137
5	1	**digital PCB Viper L** [1)]	
		VIPER DIG L digital PCB for scales with strain gauge load cell [2)]	21203097
		VIPER MB DIG digital PCB with FLASH Memory chip (soldered) for scales with MonoBloc load cell [3)]	21204025-MBL
6	1	EPROM with scale program for Viper L scales with strain gauge load cell	21203588
7	1	retaining screw	*

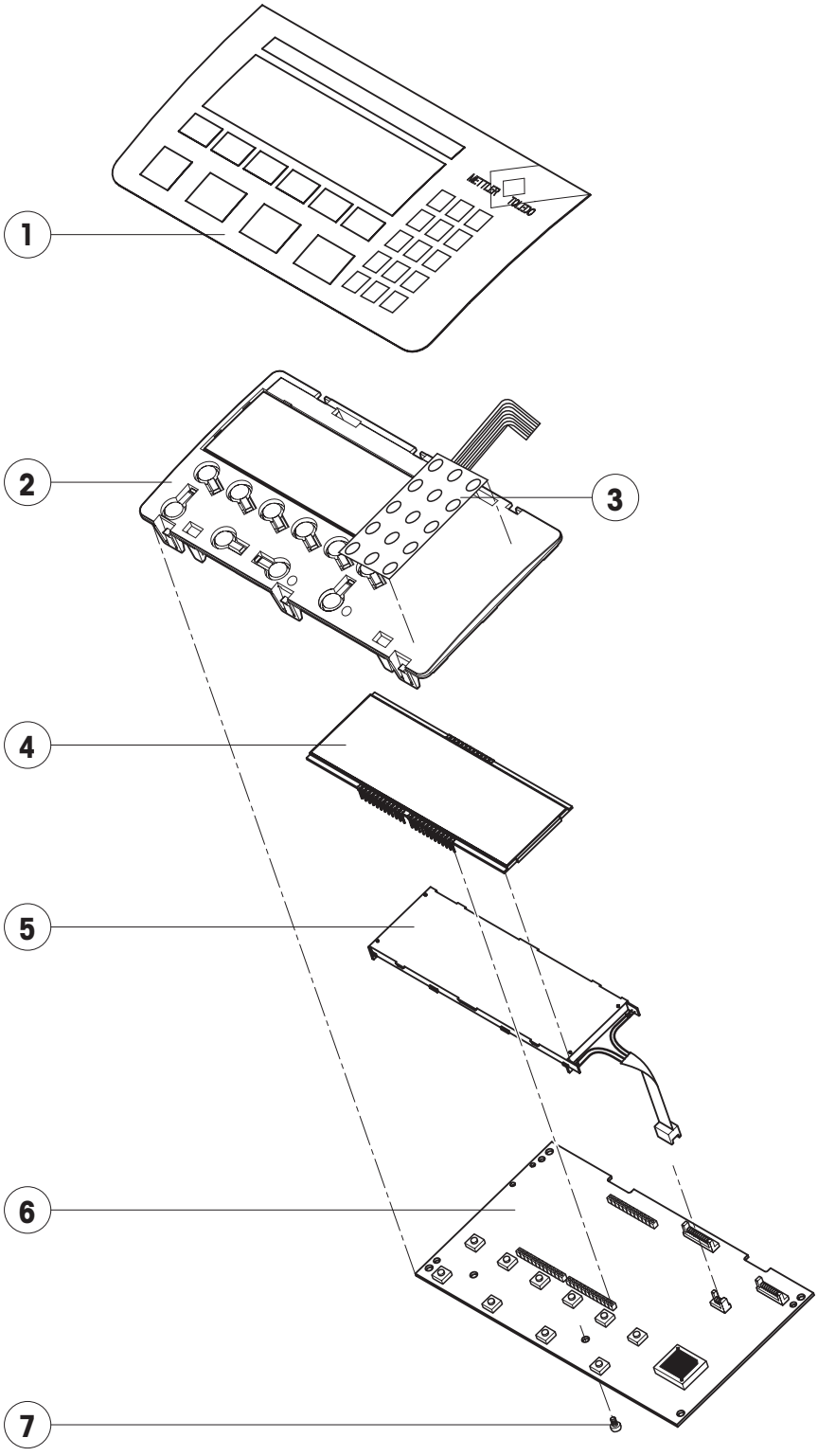
* included in the fasteners set (chapter 3)

1) without LCD and back-light unit (these parts must be ordered separately)

2) without EPROM (must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designation "MBL" following the order number specifies the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.4 Viper D display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper D large platform model	21203445
2	1	display mounting plate for Viper D (always order together with items 1 and 3)	21203448
3	1	pressure sensitive membrane for numeric keypad (15 keys) [1)]	21203439
4	1	LCD for Viper L/D	21203687
5	1	back-light unit for Viper L/D	21203137
6	1	**digital PCB Viper D** with FLASH Memory chip (soldered) [2)]	
		VIPER DIG D digital PCB for scales with strain gauge load cell [3)]	21203524-STD
		VIPER DIG D digital PCB for scales with MonoBloc load cell [3)]	21203524-MBD
7	1	retaining screw	*

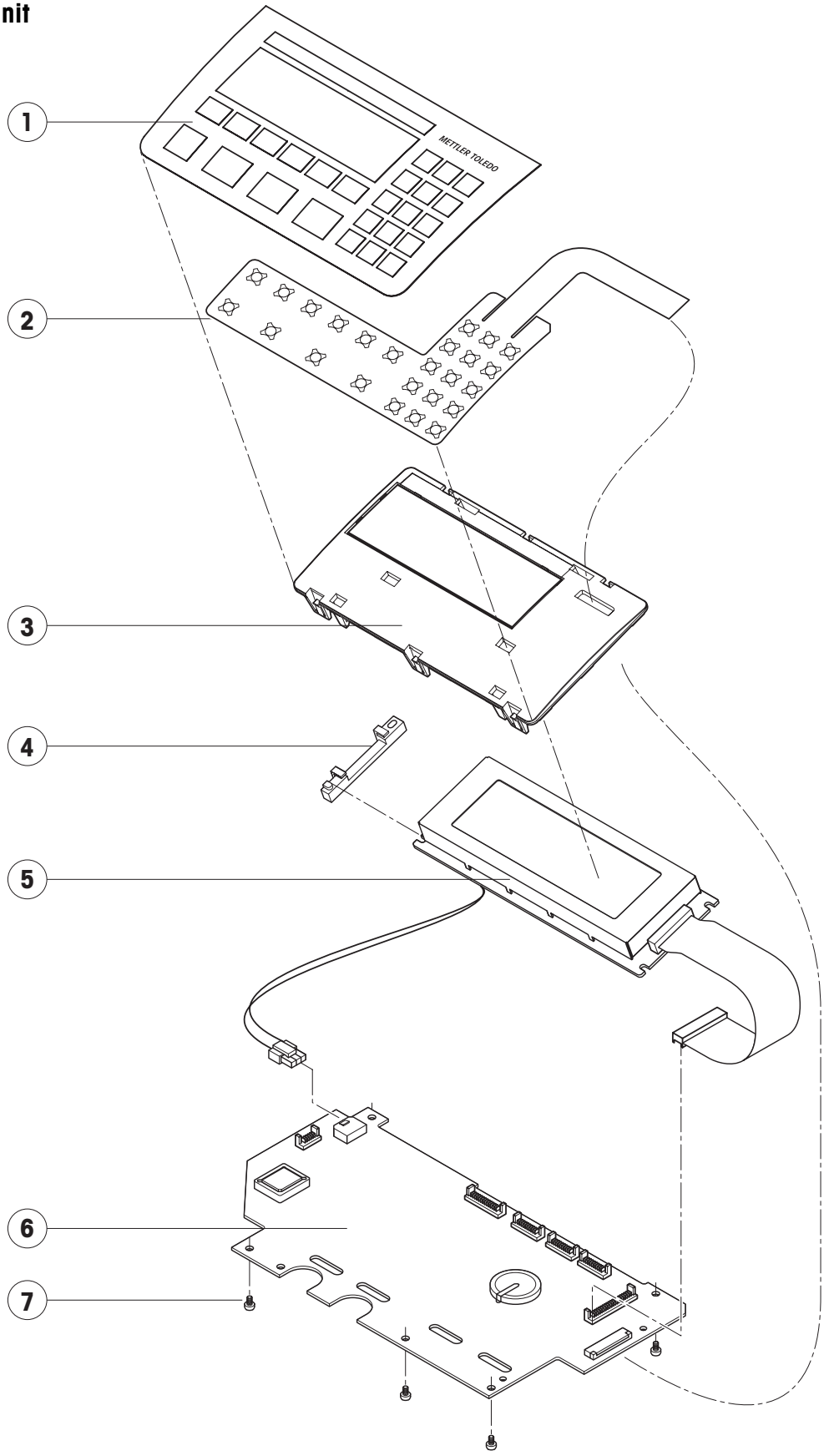
* included in the fasteners set (chapter 3)

1) always order together with item 1

2) supplied without LCD and back-light unit (these parts must be ordered separately)

3) the digital PCB with FLASH memory chip is always supplied with scale-specific software. The designations "STD" and "MBD" following the order number specify the scale software that is is loaded into the FLASH Memory chip prior to shipping.

2.5 Viper T display unit



Item	Quantity	Description	Order No.
1	1	keypad overlay for Viper T large platform model	21203132
2	1	pressure sensitive keypad membrane for numeric keypad (25 keys)	21203501
3	1	display mounting plate for Viper T (always order together with items 1 and 2)	21203507
4	1	spacer plate	21255046
5	1	LCD module 240 x 64 dots CCFL	21203515
6	1	**digital PCB**:	
		Viper T (counting scale)	21203996
		SQC 16	21203772
		Smart Remote	21203997
7	5	retaining screw	*

* included in the fasteners set (chapter 3)

3 Fasteners set

The fasteners set comprises all the standard components (screws and washers) required for service work on Viper scales and terminals, plus the spring clips that hold the analog PCB in place.

Quantity	Description	Order No.
1	**fasteners set**:	21203404
20	countersunk Torx screw M3 x 8	–
20	countersunk Torx screw M3 x 10	–
20	countersunk Torx screw M6 x 30	–
50	countersunk Torx screw M4 x 10	–
10	countersunk Torx screw M4 x 12	–
20	button head Torx screw M3 x 6	–
30	button head Torx screw M4 x 12	–
30	button head Torx screw M5 x 12	–
20	wide flange washer 4.3 x 20	–
20	wide flange washer 5.3 x 20	–
20	countersunk Torx screw M6 x 16	–
20	spring clip	–
50	raised cheese head Torx screw M4 x 6	–
10	screw lock	–
10	Torx oval head tapping screw 2.9 x 13	–

Section 4

Viper terminals

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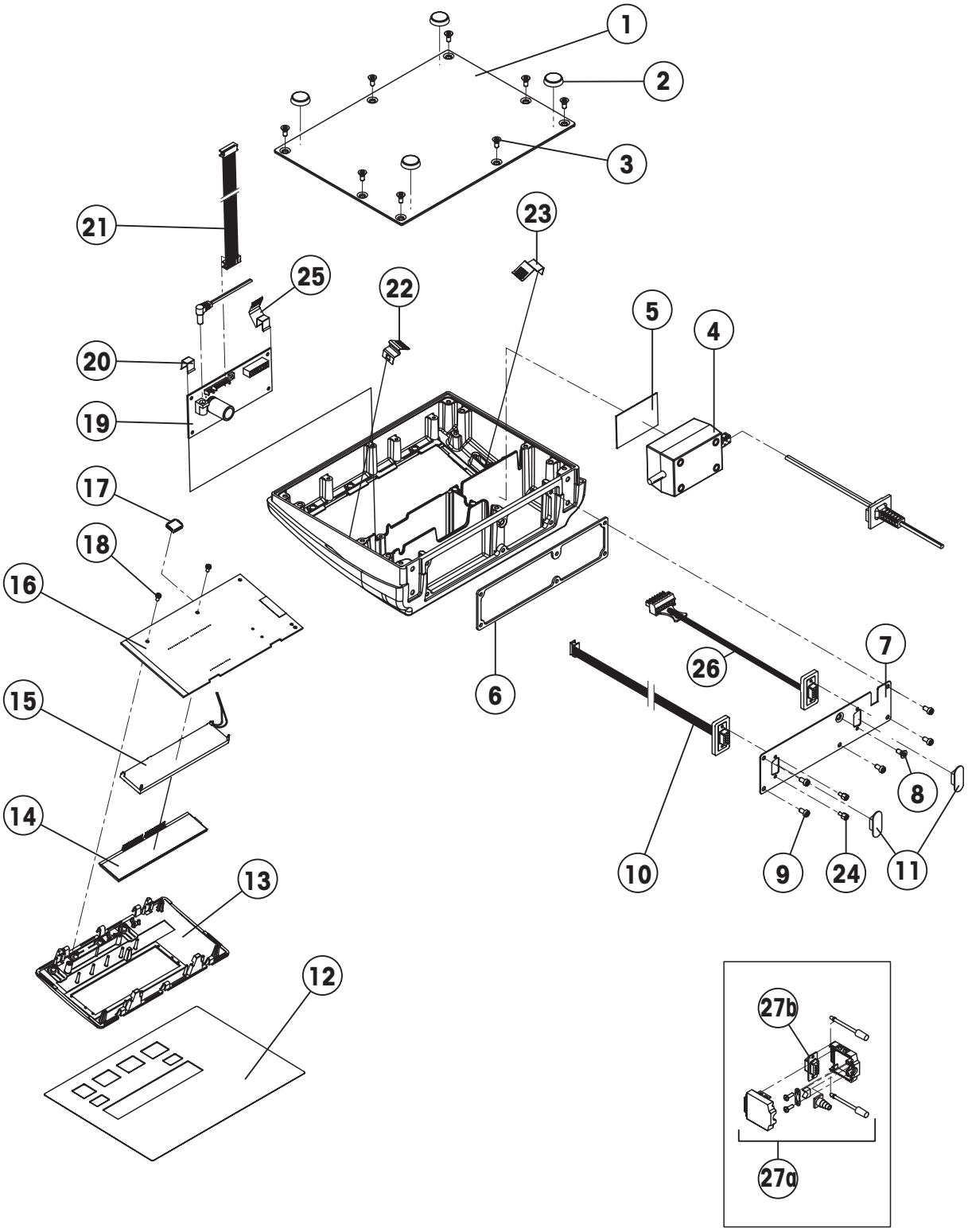
Repair: see section 6

1 Terminals: spare parts and exploded view drawings

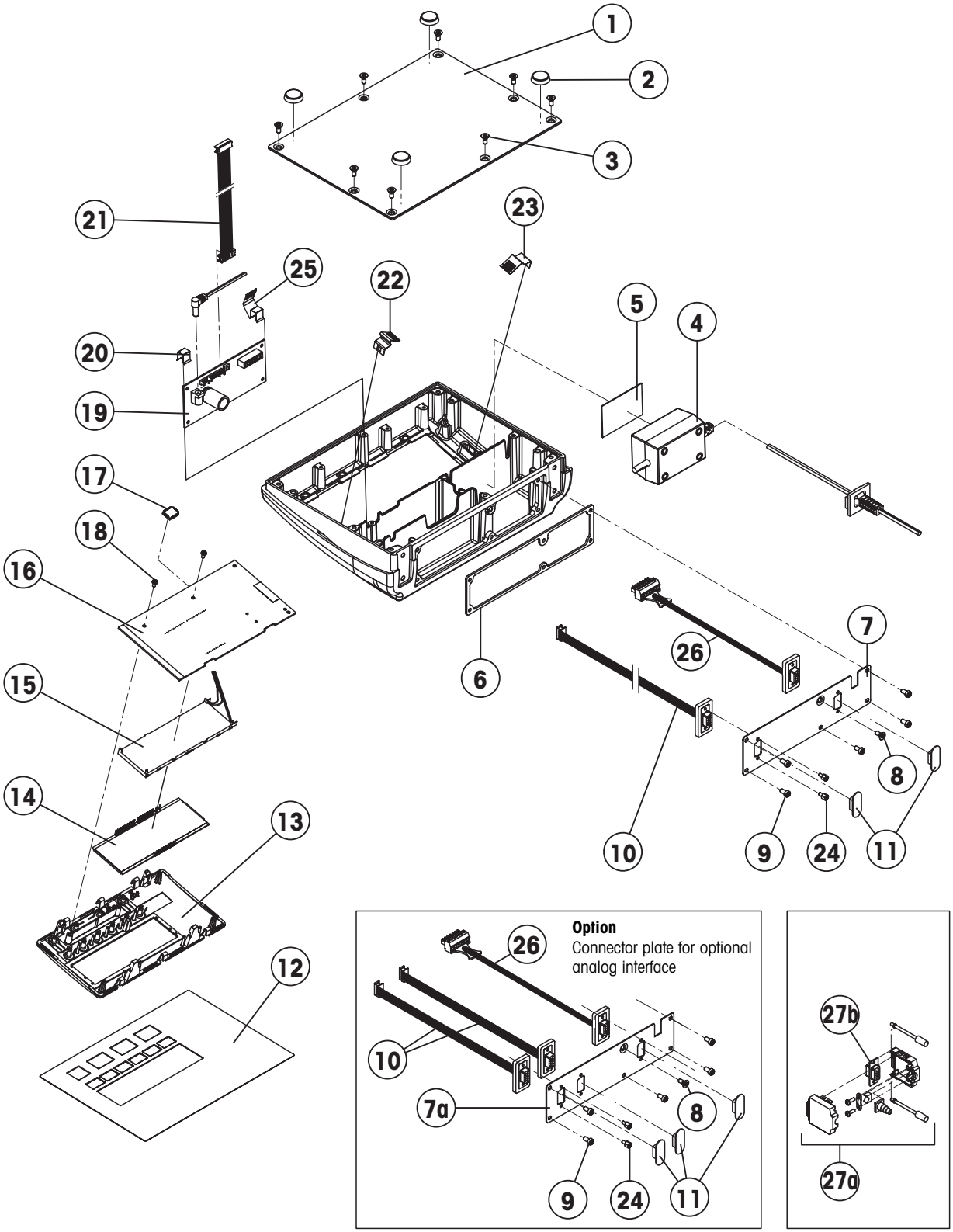
1.1 Viper RM terminal



Item	Quantity	Designation	Part no.
1	1	base plate with seal attached	21255118
2	4	rubber foot	00200068
3	8	countersunk screw M4 x 8 Torx T20	*
4	1	AC adapter 10W USA/Japan version	21255102
5	1	adhesive tape for AC adapter	21203184
6	1	seal for terminal rear panel	21255012
7	1	connector plate for 2 interfaces (RS232C/load cell)	22010041
8	1	countersunk screw M4 x 12 Torx T20	*
9	5	fillister head screw M4 x 8 Torx T20	*
10	1	RS232C interface IP65 with cable (soldered)	21203717
11	2	dust cover for interfaces	11101560
12	1	keypad overlay Viper RM	22010046
13	1	display mounting plate BC (always order together with item 12)	21255041
14	1	LC display SW	21203134
15	1	backlighting SW	21203136
16	1	digital board Viper DIG M	21203098
17	1	EPROM with software for Viper RM	21203583
18	2	Torx oval head tapping screw 2.9 x 13	*
19	1	analog board 7k	21255054
20	1	fastening clamp for analog board *	21203166
21	1	A/D cable 300 mm	21203167
22	1	EMC clamp short	21203480
23	1	EMC clamp long	21255047
24	4	screw lock	*
25	1	EMC clamp for analog board	22007948
26	1	load cell connection cable with Sub D-socket and plug for analog board	22010055
27	–	**9-pin Sub-D connector** (for connecting the load cell to the terminal):	———
27a	1	Sub-D standard housing (dismantled)	22007870
27b	1	pin base	22007869

* Included in small parts set (section 3).

1.2 Viper RL terminal

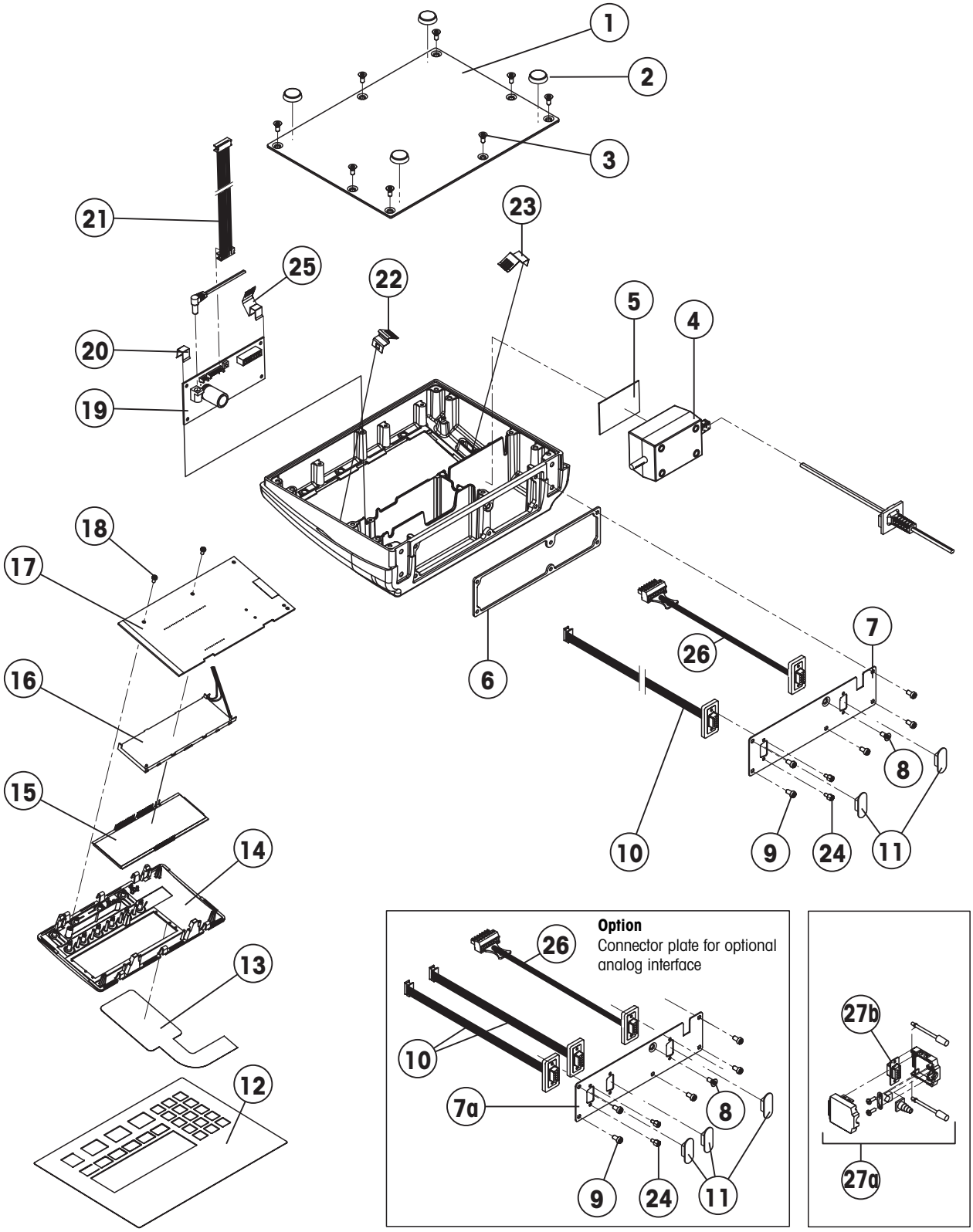


Item	Quantity	Designation	Part no.
1	1	base plate with seal attached	21255118
2	4	rubber foot	00200068
3	8	countersunk screw M4 x 8 Torx T20	*
4	1	AC adapter 10W USA/Japan version	21255102
5	1	adhesive tape for AC adapter	21203184
6	1	seal for terminal rear panel	21255012
7	1	**standard**: connector plate for 2 interfaces (RS232C/load cell)	22010041
7a	1	**option**: connector plate for 3 interfaces (RS232C/load cell/analog interface option)	22010043
8	1	countersunk screw M4 x 12 Torx T20	*
9	5	fillister head screw M4 x 8 Torx T20	*
10	1	RS232C interface IP65 with cable (soldered) [1)]	21203717
11	2	dust cover for interfaces	11101560
12	1	keypad overlay Viper RL	22010047
13	1	display mounting plate RL (always order together with item 12)	22010038
14	1	LC display FC	21203687
15	1	backlighting BC/FC	21203137
16	1	digital board Viper DIG L	21203097
17	1	EPROM with software for Viper RL	21203588
18	2	Torx oval head tapping screw 2.9 x 13	*
19	1	analog board 7k	21255054
20	1	fastening clamp for analog board *	21203166
21	1	A/D cable 300 mm	21203167
22	1	EMC clamp short	21203480
23	1	EMC clamp long	21255047
24	4	screw lock	*
25	1	EMC clamp for analog board	22007948
26	1	load cell connection cable with Sub D-socket and plug for analog board	22010055
27	–	**9-pin Sub-D connector** (for connecting the load cell to the terminal):	———
27a	1	Sub-D standard housing (dismantled)	22007870
27b	1	pin base	22007869

* Included in small parts set (section 3).

[1)] If an analog interface option is built into the OptionPac (see chapter 2), a second cable of this type is used to connect the analog interface option board to the connector plate of the terminal (item 7a above).

1.3 Viper RD terminal

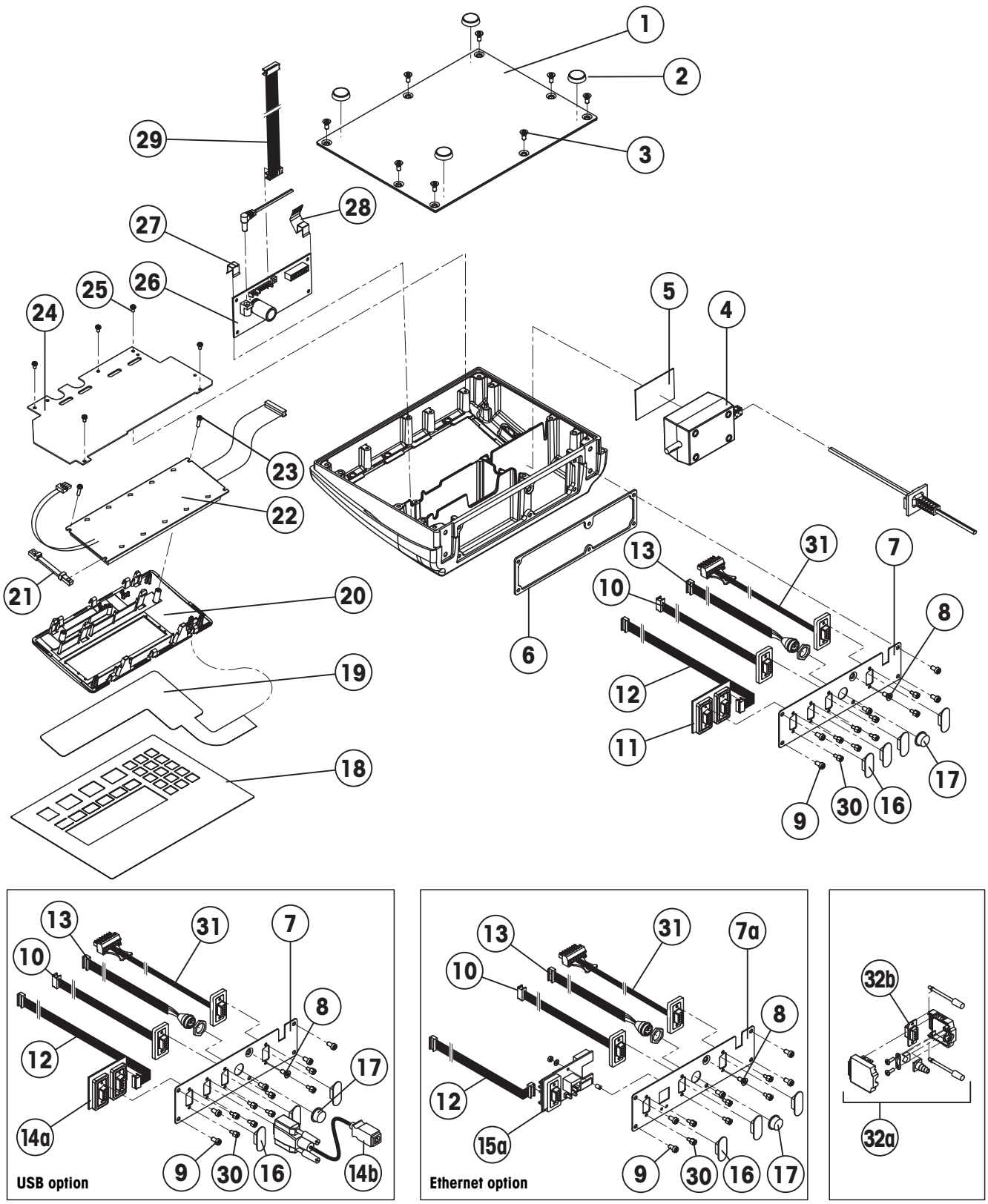


Item	Quantity	Designation	Part no.
1	1	base plate with seal attached	21255118
2	4	rubber foot	00200068
3	8	countersunk screw M4 x 8 Torx T20	*
4	1	AC adapter 10W USA/Japan version	21255102
5	1	adhesive tape for AC adapter	21203184
6	1	seal for terminal rear panel	21255012
7	1	**standard**: connector plate for 2 interfaces (RS232C/load cell)	22010041
7a	1	**option**: connector plate for 3 interfaces (RS232C/load cell/analog interface option)	22010043
8	1	countersunk screw M4 x 12 Torx T20	*
9	5	fillister head screw M4 x 8 Torx T20	*
10	1	RS232C interface IP65 with cable (soldered) [1)]	21203717
11	2	dust cover for interfaces	11101560
12	1	keypad overlay Viper RD	22010048
13	1	numeric membrane keypad (always order together with item 12)	21203439
14	1	display mounting plate RD (always order together with items 12 and 13)	22010039
15	1	LC display FC	21203687
16	1	backlighting BC/FC	21203137
17	1	digital board Viper DIG D (incl. soldered FLASH Memory chip with software)	21203524-STD
18	2	Torx oval head tapping screw 2.9 x 13	*
19	1	analog board 7k	21255054
20	1	fastening clamp for analog board *	21203166
21	1	A/D cable 300 mm	21203167
22	1	EMC clamp short	21203480
23	1	EMC clamp long	21255047
24	4	screw lock	*
25	1	EMC clamp for analog board	22007948
26	1	load cell connection cable with Sub D-socket and plug for analog board	22010055
27	–	**9-pin Sub-D connector** (for connecting the load cell to the terminal):	———
27a	1	Sub-D standard housing (dismantled)	22007870
27b	1	pin base	22007869

* Included in small parts set (section 3).

[1)] If an analog interface option is built into the OptionPac (see chapter 2), a second cable of this type is used to connect the analog interface option board to the connector plate of the terminal (item 7a above).

1.4 Viper RT terminal



Item	Quantity	Designation	Part no.
1	1	base plate with seal attached	21255118
2	4	rubber foot	00200068
3	8	countersunk screw M4 x 8 Torx T20	*
4	1	AC adapter 10W USA/Japan version	21255102
5	1	adhesive tape for AC adapter	21203184
6	1	seal for terminal rear panel	21255012
7	1	**standard**: connector plate for 3 x RS232C/PS2/load cell [1)]	22010040
7a	1	**option**: connector plate for 2 x RS232C/Ethernet/PS2/load cell	22010042
8	1	countersunk screw M4 x 12 Torx T20	*
9	5	fillister head screw M4 x 8 Torx T20	*
		Standard interfaces:	
10	1	RS232C interface IP65 with cable (soldered) [2)]	21203717
11	1	board with 2x RS232C IP65 (requires connecting cable item 12)	21255081
12	1	connecting cable for 2 RS interfaces	21203490
13	1	PS2 cable 18.1"/460 mm (keyboard connection)	21204107
14		**USB option** (upgrade kit see chapter 4.2.2)	
14a	1	board USB option (1 Sub-D socket for RS232C / 1 Sub-D connector for USB) [3)]	21204114
14b	1	USB cable (with Sub-D and USB type B sockets)	21204031
15	1	**Ethernet option** (requires connector plate item 7a) (upgrade kit see chapter 4.2.3):	
15a:	1	board Ethernet option (1x RS232C /1 x Ethernet RJ45) [3)]	21204027
16	4	dust cover for interfaces	11101560
17	1	dust cover for PS2 interface	22010058
18	1	keypad overlay Viper RT	22010049
19	1	numeric keypad membrane (25 keys) (always order together with item 18)	21203501
20	1	display mounting plate RT/SC (always order together with items 18 and 19)	21255043
21	1	spacer plate	21255046
22	1	LCD module 240 x 64 dots CCFL	21203515
23	2	Torx oval head tapping screw 2.9 x 13	*
24	1	digital board Viper T/RT (incl. soldered FLASH Memory chip with software)	21203996
25	5	fillister head screw M3 x 6 Torx T10	*
26	1	analog board 7k	21255054
27	1	fastening clamp for analog board *	21203166
28	1	EMC clamp for analog board	22007948
29	1	A/D cable 300 mm	21203167

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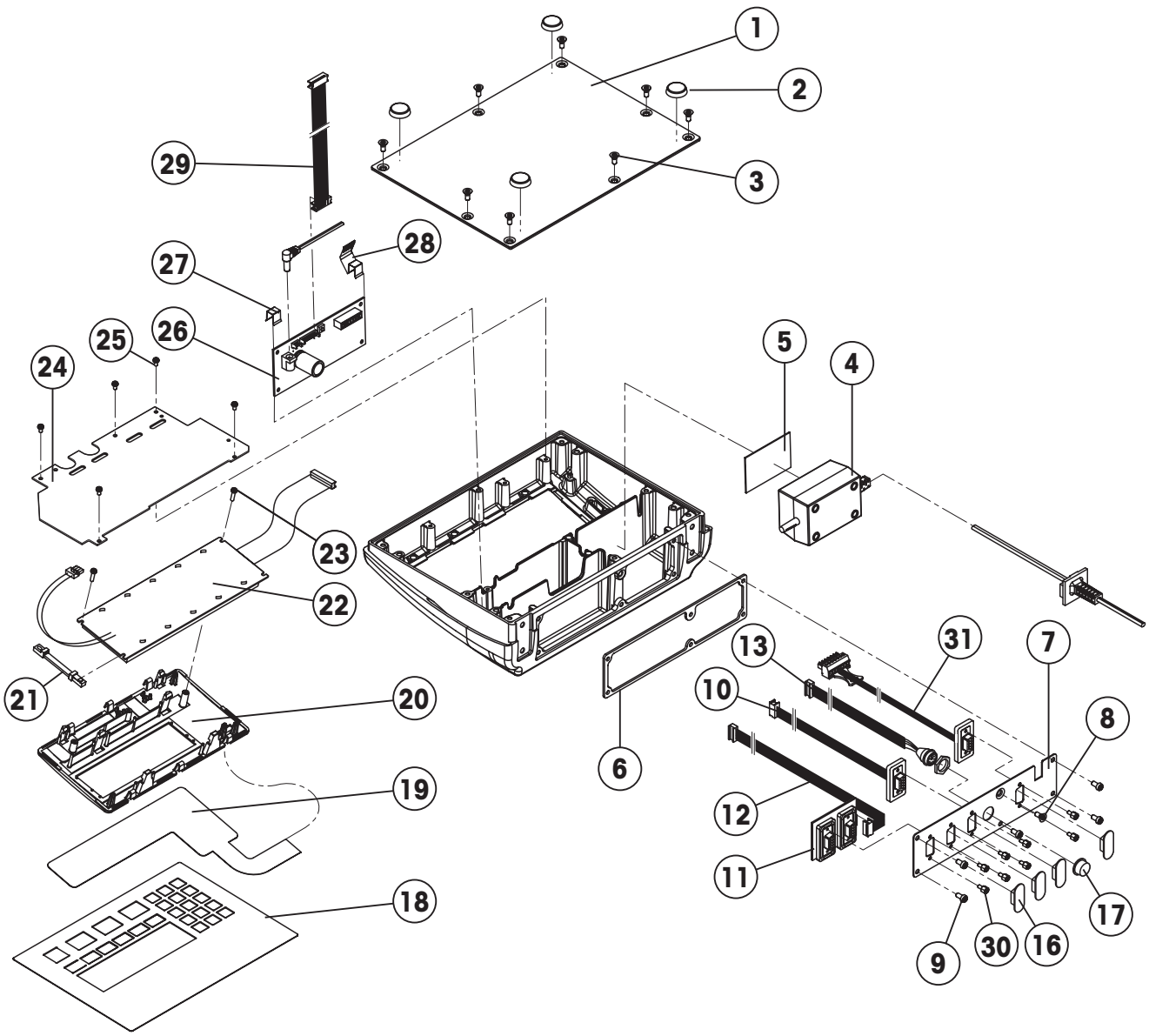
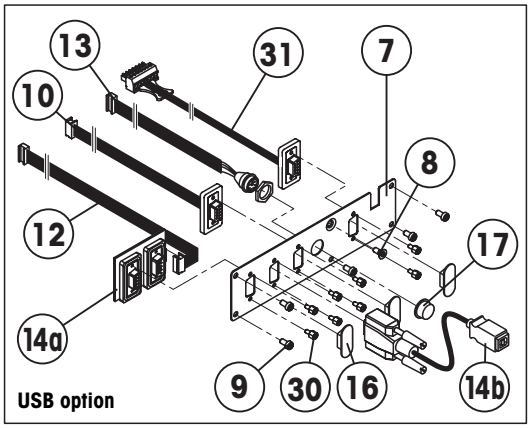
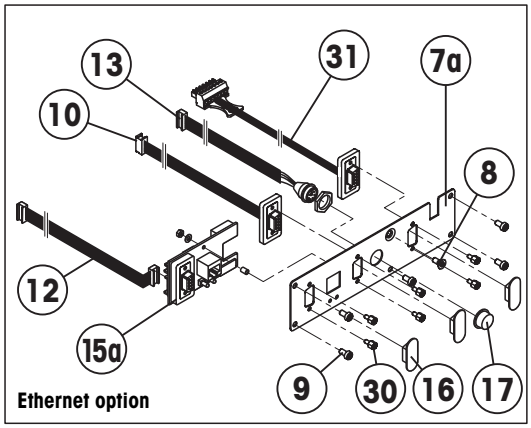
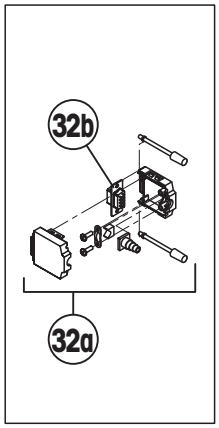
Viper RT terminal (continued)









30	8	screw lock	*
31	1	load cell connection cable with Sub D-socket and plug for analog board [1)]	22010055
32	–	**9-pin Sub-D connector** (for connecting the load cell to the terminal):	———
32a	1	Sub-D standard housing (dismantled)	22007870
32b	1	pin base	22007869

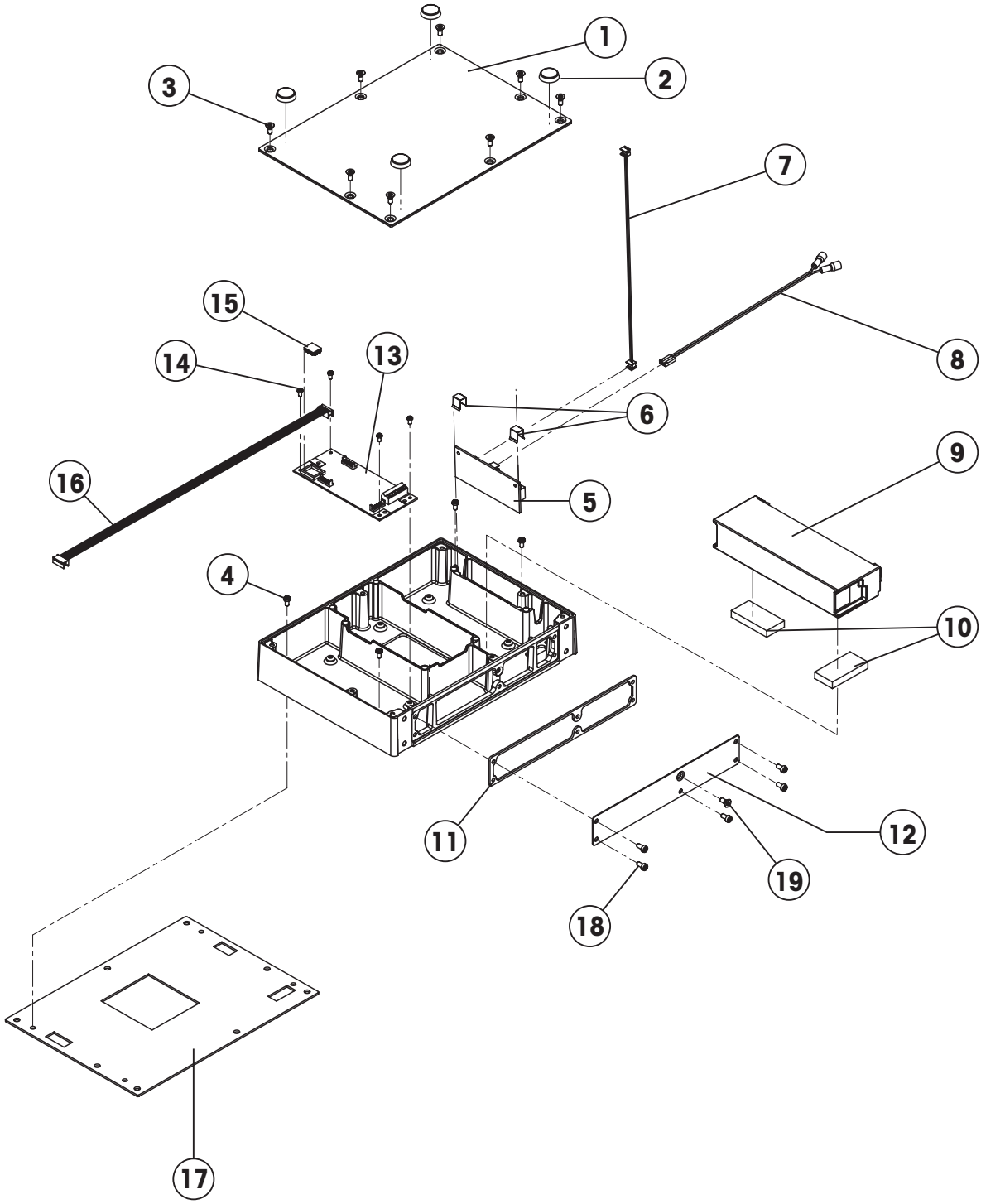
* Included in small parts set (section 3).

1) Is also used with analog interface option and USB option.

2) If an analog interface option is built into the OptionPac (see chapter 2), a second cable of this type is used to connect the analog interface option board to the connector plate of the terminal (item 7 above).

3) replaces the standard interface board (2 x RS232C), part no. 21255081. The standard connecting cable (part no. 21203490) can be used with the optional interface board. However, if an analog interface option is present the "ETH/USB option" cable (part no. 22010154) must be used instead of the standard connecting cable (part no. 21203490). This cable is included in the respective upgrade kits (see chapters 4.2.2 and 4.2.3).

2 OptionPac



Item	Quantity	Designation	Part no.
1	1	base plate with seal attached	21255118
2	4	rubber foot	00200068
3	8	countersunk screw M4 x 8 Torx T20	*
4	4	fillister head screw M5 x 12	*
5	1	charging circuit board for battery	21255052
6	2	fastening clamp for charging circuit board *	21203166
7	1	connecting cable charging circuit – analog board	21203233
8	1	battery cable	21203231
9	1	battery 12 V/2.2 Ah (always order together with item 10)	21203232
10	2	adhesive tape for battery	21255260
11	1	seal for back panel OptionPac	21255013
12	1	back panel without openings	21255003
13	1	analog interface option board (Viper RL, RD and RT only)	21203383
14	4	tapping screw M3 x 6 (Viper RL, RD and RT only)	21050008
15	1	**EPROM with interface software for analog interface** (Viper RL, RD and RT only)	
		EPROM for Viper RL and RD analog interface	21203915
		EPROM for Viper RT analog interface	21255318
16	1	cable for analog option (Viper RL, RD and RT only)	21203604
17	1	seal (between OptionPac and Terminal)	21255011
18	5	fillister head screw M4 x 8 Torx T20	*
19	1	countersunk screw M4 x 10 Torx T20	*

* Included in small parts set (section 3)

3 Small parts set

The fasteners set comprises all the standard components (screws, washers. etc.) required for service work on Viper scales and terminals.

Quantity	Description	Order No.
1	**fasteners set**:	21203404
20	countersunk Torx screw M3 x 8	–
20	countersunk Torx screw M3 x 10	–
20	countersunk Torx screw M6 x 30	–
50	countersunk Torx screw M4 x 10	–
10	countersunk Torx screw M4 x 12	–
20	button head Torx screw M3 x 6	–
30	button head Torx screw M4 x 12	–
30	button head Torx screw M5 x 12	–
20	wide flange washer 4.3 x 20	–
20	wide flange washer 5.3 x 20	–
20	countersunk Torx screw M6 x 16	–
20	spring clip	–
50	raised cheese head Torx screw M4 x 6	–
10	screw lock	–
10	Torx oval head tapping screw 2.9 x 13	–

4 Upgrade kits

Installed Viper RL, RD and RT terminals can be subsequently upgraded with upgrade kits. The respective kits contain all the necessary parts.

4.1 Upgrade kits for Viper RM, RL and RD terminals

The following upgrade kits are exclusively designed for Viper RM, RL and RD terminals.

4.1.1 "Analog Interface Option Viper RL/RD" upgrade kit

This upgrade kit allows connection of a second, analog weighing platform to a Viper RL or RD terminal.

Quantity	Designation	Part no.
1	**Upgrade kit "Analog Interface Option Viper RL/RD"** comprising:	**22010143**
1	OptionPac cpl.	21255117
4	round head screw M5 x 12 Torx	22005232
5	round head screw M4 x 6 Torx	22003003
1	screw DIN7500 M4 x 10 Torx	22003002
1	back panel without openings	21255003
1	analog interface option board	21203383
	EPROM with interface software RL/RD	21203915
1	cable for analog option	21203604
1	RS232C interface IP65 with cable (soldered)	21203717
4	tapping screw M3 x 6	21050008
1	connector plate for 3 interfaces (RS232C/load cell/analog interface option)	22010043
2	screw lock	21203570
1	Sub-D standard housing (dismantled)	22007870
1	pin base	22007869
1	dust cover for interfaces	11101560
1	flat ribbon cable clamp	21255122
1	type plate Viper Terminal (sticker)	22010059
1	additional plate (sticker with interface designation)	22010143

Drawings of spare parts see chapters 1 and 2.

4.1.2 "AccuPac Viper RM/RL/RD" upgrade kit

This upgrade kit enables the Viper RM, RL and RD terminals to be operated without being connected to the power supply.

Quantity	Designation	Part no.
1	**Upgrade kit "AccuPac"** comprising:	**2210144**
1	OptionPac cpl.	21255117
4	round head screw M5 x 12 Torx	22005232
5	round head screw M4 x 6 Torx	22003003
1	screw DIN7500 M4 x 10 Torx	22003002
1	back panel without openings	21255003
1	battery cable	21203231
2	adhesive tape for battery	21255260
1	battery 12V/2.2Ah	21203232
1	connecting cable charging circuit – analog board	21203233
2	fastening clamp for charging circuit board	21203166
1	charging circuit board for battery	21255052
1	flat ribbon cable clamp	21255122

Drawings of spare parts see chapter 2.

4.2 Upgrade kits for Viper RT terminal

The following upgrade kits are exclusively designed for the Viper RT terminal.

4.2.1 "Analog Interface Option Viper RT" upgrade kit

This upgrade kit allows connection of a second, analog weighing platform to a Viper RL or RD terminal.

Quantity	Designation	Part no.
1	**Upgrade kit "Analog Interface Option Viper RT"** comprising:	**22010145**
1	OptionPac cpl.	21255117
4	round head screw M5 x 12 Torx	22005232
5	round head screw M4 x 6 Torx	22003003
1	screw DIN7500 M4 x 10 Torx	22003002
1	back panel without openings	21255003
1	analog interface option board	21203383
	EPROM with interface software RT	21255318
1	cable for analog option	21203604
2	RS232C interface IP65 with cable (soldered)	21203717
4	tapping screw M3 x 6	21050008
1	Sub-D standard housing (dismantled)	22007870
1	pin base	22007869
1	flat ribbon cable clamp	21255122
1	type plate Viper Terminal (sticker)	22010059
1	additional plate (sticker with interface designation)	22010145

Drawings of spare parts see chapters 1 and 2.

4.2.2 "USB Interface Viper RT" upgrade kit

This upgrade supplements replaces the existing RS232C interface "COM2" with a USB interface (**U**niversal **S**erial **B**us).

Quantity	Designation	Part no.
1	**Upgrade kit "USB Interface Viper RT"** comprising:	**22010147**
1	board USB option (slave) IP65 (Sub-D socket RS232C / Sub-D connector for USB)	21204114
1	CD-ROM with USB drivers for Microsoft Windows®	22010158
1	USB cable (with Sub-D and USB type B sockets)	21204031
1	cable ETH/USB option (required only if analog interface option is present)	22010154
1	additional plate (sticker with interface designation)	22010147

Drawings of spare parts see chapter 1.4.

4.2.3 "Ethernet Interface Viper RT" upgrade kit

This upgrade supplements replaces the existing RS232C interface "COM2" with an Ethernet interface.

Quantity	Designation	Part no.
1	**Upgrade kit "Ethernet Interface Viper RT"** comprising:	**22010148**
1	connector plate for 2 x RS232C/Ethernet/PS2/load cell	22010042
1	spacer for Ethernet interface	22008017
1	hexagon nut M3 DIN934	22008019
1	washer M3 DIN125	22008020
1	board Ethernet option (1x RS232C /1 x Ethernet RJ45)	21204027
1	cable ETH/USB option (required only if analog interface option is present)	22010154
1	additional plate (sticker with interface designation)	22010148

Drawings of spare parts see chapter 1.4.

4.2.4 "AccuPac Viper RT" upgrade kit

This upgrade kit enables the Viper RT terminal to be operated without being connected to the power supply.

This upgrade kit is not yet available

4.3 Certification set for Viper terminals and scales

This upgrade kit enables an authorized W & M inspector to properly seal a Viper weighing system after certification.

Quantity	Designation	Part no.
1	**Upgrade kit "Viper certification set "** comprising:	**21203903**
1	securing plate	21203485
1	type plate Viper Terminal (sticker)	22010059
3	capstan headed screw DIN404	00205949

Section 5

Repair of Viper scales

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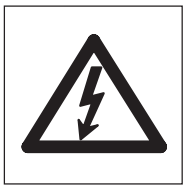
1 Important information

This section describes how to change individual components of the Viper scales. When doing this, please refer to the exploded view drawings and spare parts lists in sections 2 and 3. **Important**: After replacing components, a **functional check** of the scale must always be carried out.

1.1 Safety and environment

The following **instructions must be observed for all repairs**:



- **Disconnect the scale from the power supply before starting repair work!**
- The scale contains electronic components which can be damaged by electrostatic discharges. **You must therefore always wear a grounded wriststrap when performing repair work!** Grounded wriststraps can be purchased from specialist electronics dealers.
- Defective components must be disposed of according to the instructions in section 1!

- **Servicing work in explosion hazard zones is strictly prohibited.** Ignition power could inadvertently be generated, causing an explosion. **Servicing work should therefore only be undertaken in secure areas.** The location in which the scale is installed must be declared by the system operator to be safe for the duration of the repair work. If no such declaration is available, the scale must be switched off and disconnected from the power supply and moved to a safe area.
- The scales can also be disconnected and reconnected to the power supply in potentially explosive environments provided that the power supply has first been switched off.

1.2 Tools and working aids

- Screwdrivers: Torx T10, T20, T25, and T30; Phillips 5 mm; flat type size 0 and 4
- Torque wrench up to 10 Nm
- Wrench heads Torx T25, T30, and hex 17 mm
- Open-end wrench, size 20
- Feeler gauge
- Carpet knife ("cutter")
- Grounded wriststrap (as protection against electrostatic discharges)
- Weights of class M1 or F1

1.3 Work instructions

Take great care when inserting and tightening screws into holes tapped **directly into the aluminum casting**: After inserting the screw, always turn it first about 1 turn counterclockwise until it engages in the existing thread, and only then screw it tight! Do not tighten the screw too much, since this may damage the thread in the aluminum casting!

2 Replacing the keypad overlay

Notes for Viper explosion proof (Ex) scales: To prevent electrostatic charging of the keypad overlay, the display insert has a metallized coating. Since this coating is detached when the keypad overlay is removed, the keypad overlay on these scales can only be replaced in conjunction with the display insert, the specification plate and the "Ex" sticker (see chapter 7).

- Lift up the defective keypad overlay (if necessary carefully prying it up with a knife) and gently peel it off the scale. **Note**: take care that the specification label is not damaged when the membrane is removed!
- Carefully clean display mounting plate, keypad membrane (Viper T) and window (removing all traces of adhesive).
- Make sure that the specification label is in its correct position (must be visible through the window in the keypad overlay), then peel off the protective film from the new membrane and carefully affix the latter to the display mounting plate. Press the keypad overlay down uniformly.

3 Replacing the AC adapter

Note: The AC adapter has a fuse as overcurrent protection. For safety reasons this fuse cannot be replaced, and the AC adapter must therefore be replaced completely if the fuse blows. This applies only to scales that are connected directly to the AC power line (without rechargeable battery and external AC adapter).

- Unscrew the adjustable feet and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.
- Disconnect the AC adapter cable from the analog PCB.
- Remove the AC adapter (held on by an adhesive patch) from the wall of the housing . If necessary, carefully insert a flat blade (knife or screwdriver) between adapter and housing and pry them apart. Remove all traces of adhesive from the housing.
- Undo the 4 screws holding the blanking plate in place (rear panel of scale) and remove the plate.
- Slide the AC adapter power cord grommet out of the blanking plate. Remove the AC adapter from the scale.
- Place the new AC adapter in the scale and fix it in place with the adhesive patch.
- Locate the power cord grommet (with its closed side facing up!) in the center of the blanking plate slot, then press the grommet down thoroughly. This requires a fair amount of force which is intended as it ensures proper IP protection. **Caution: Never use a hammer or similar tool for pushing the grommet into place because this may damage the wires!** Once the grommet is properly located in the slot you may fasten the blanking plate.

  Note for scales with IP65 protection: Check that the seal of the blanking plate is still correctly fastened to the housing. If it is not, the seal must be replaced as follows: Remove the existing seal from the housing so as to leave no trace. Clean and degrease the surface to which it was fastened. Carefully affix the new seal to the housing in exactly the right position.
- Plug the AC adapter output cable onto the analog PCB, then replace the bottom plate and the adjustable feet.

4 Replacing the battery

Note: This procedure is only required for scales that have a built-in rechargeable battery and an external AC adapter.

- Unscrew the adjustable feed screws and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.
- Undo the screws holding the RS connector plate in place (rear panel of scale) and remove the plate.
- Slide the charging PCB out from the guide and remove both plugs on the PCB (connection cable to battery or analog PCB).
- Remove the battery from the wall of the housing (held in place by the adhesive strip). If necessary, carefully insert a flat blade (knife or screwdriver) between the battery and housing and pry them apart. Remove all traces of adhesive from the housing.
- Remove the battery from the scale and disconnect the cable to the charging PCB.

- Plug the cable to the charging PCB into the new battery (+ = red cable, – = blue cable).
- Attach the adhesive patch to the wall of the housing, remove its protective foil, place the battery in the scale and press it against the wall of the housing.
- Attach both plugs with connectors to the charging PCB and slide the PCB back it into the guide.
- Replace the RS connector plate and secure with the screws.

  Note for scales with IP65 protection: Check that the seal of the RS connector plate is still correctly fastened to the housing. If it is not, the seal must be replaced as follows: Remove the existing seal from the housing so as to leave no trace. Clean and degrease the surface to which it was fastened. Carefully affix the new seal to the housing in exactly the right position.
- Check the connections of all cables: The cables must lie in the correct slots of the housing, to ensure they are not pinched by the bottom plate.
- Replace the bottom plate and the adjustable feet.

5 Replacing the charging PCB

Note: This procedure is only required for scales with a built-in battery. **Before fitting the new charging PCB, check that the correct AC adapter for battery operation is present** (see spare parts lists in sections 2 and 3). If not, the AC adapter must also be replaced.

- Undo the screws holding the rear panel of the scale and remove the panel.
- Slide the PCB out from the guide and remove both plugs on the PCB (connection cable to battery and analog PCB).
- Attach both plugs with connectors to the (new) charging PCB and slide it into the guide.
- Replace the rear panel and secure with the 4 screws.

  Check that the seal of the rear panel is still correctly fastened to the housing. If it is not, the seal must be replaced as follows: Remove the existing seal from the housing so as to leave no trace. Clean and degrease the surface to which it was fastened. Carefully affix the new seal to the housing in exactly the right position.

6 Replacing the analog PCB

Note: For **scales with MonoBloc load cells** the entire weighing module is usually replaced as its components (load cell and analog PCB) are a matching set: The analog PCB contains all temperature compensation data of the load cell (TK data). If only the analog PCB is to be replaced, then please note the following: A printout with the TK data of the load cell should be included in every scale. If this is not the case then this data must be printed out before the analog PCB is replaced. Otherwise the TK data cannot be loaded into the new analog PCB (see section 7)!
Viper Ex scales also require the PSU power supply unit in order to print out and restore TK data. If this is not available, the entire weighing module must be replaced.

- Unscrew the adjustable feet and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.
- Disconnect load cell cable, connecting cable to the digital PCB and the AC adapter output cable from the analog PCB.
- Pull off the two spring clips from the analog PCB and remove it.
- Fit the new analog PCB and fix it in place with the spring clips.
- Connect the load cell cable, the A/D cable from the digital PCB and the AC adapter output cable to the analog PCB.
- Replace the bottom plate and the adjustable feet.

Note: After replacing the analog PCB all scale data plus all user settings must be re-entered (see section 5)! The scale must first be calibrated and a linearization and recalibration carried out as required. For scales with MonoBloc load cells the temperature compensation data of the load cell must first be loaded into the new analog PCB via computer (see section 7).

7 Replacing the display mounting plate, display unit and digital PCB

The display mounting plate is located underneath the keypad overlay and is located in the scale housing by 6 snaps. The display unit comprises the digital PCB, the liquid crystal display (LCD) and the back-light unit (on the Viper T the lighting is integrated into the LCD module). It is held in place on the mounting plate by snaps and one screw. The digital PCB is connected to the analog PCB and the RS232C interface by two ribbon cables (on Viper D and T scales there is an additional cable for the keypad).

7.1 Preliminary work

- Unscrew the adjustable feet and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.
- **Viper M, L und D**: Remove both EMC clamps. Undo the retaining screw which fastens the display unit to the mounting plate. Pull back the two front cantilever snaps holding the display unit to release it, raise the front edge of the display unit and withdraw it from the rear snaps. Disconnect the RS232 cable and the connecting cable to the analog PCB from the digital PCB (on Viper D scales also remove the cable of the numeric keypad membrane). Remove the display unit.
- **Viper T**: Unfasten the 5 screws holding the digital PCB to the scale housing. Detach all cable connections from the digital PCB and PCB. Unfasten the mounting screw fixing the LCD module to the display insert. Push the front retaining clips on the LCD module forward slightly, swivel the module up and pull it out from the rear brackets.

7.2 Replacing the display mounting plate

Note: In order to replace the display mounting plate, the keypad overlay must be removed. This cannot be reused and must also be replaced. On Viper D and T scales the pressure sensitive membrane for the keypad must be replaced at the same time as it cannot be removed from the display mounting plate without damage.

- Remove keypad overlay (chapter 2).
- Push the 3 cantilever snaps at the front edge of the display mounting plate inwards to release the plate and remove it to the front.
- Insert the new display mounting plate into the aperture so that it clicks into place. **Note**: On **Viper Ex scales** the window on the display insert is covered with a conductive, transparent film. Do not touch this film otherwise fingerprints will remain visible. If necessary clean the film by wiping it gently with a soft antistatic cloth.
- **Viper D and T scales only**: peel off the protective film from the new keypad membrane and carefully affix the latter to the display mounting plate.
- Apply the new self-adhesive keypad overlay (chapter 2).

7.3 Replacing the liquid crystal display (LCD) or the back-light unit

The following steps apply only to Viper M, L and D scales. On Viper T scales the entire LCD module must be replaced where applicable (see chapter 7.1 for dismantling instructions).

- Place the display unit with the digital PCB downwards on a conductive CMOS film.
- Disconnect the backlighting ribbon cable from the digital PCB.
- Carefully insert a flat blade screwdriver (size 4) between the digital PCB and the back-light unit immediately adjacent to the connectors.
- With the screwdriver pry the liquid crystal display and the back-light unit out of the socket strips. When doing this, lever the shaft of the screwdriver against the edge of the digital PCB. Never lever the tip of the screwdriver against the surface of the

PCB, as this could damage the latter!

- Remove the upper protective cover of the back-light unit.
- Place the new back-light unit onto the digital PCB (it snaps into place on the board).
- Remove the upper and lower protective cover of the LCD.
- Carefully place the LCD onto the back-light unit and ensure that the connector pins are correctly aligned with the socket strips. When correctly positioned, the ends of the LCD and back-light unit are flush. Use a flat object such as a ruler to exert a uniform pressure on the LCD and gently push it home.
- Push the back-light unit ribbon cable connector onto the digital PCB pins.

7.4 Replacing the digital PCB

The following steps apply only to Viper M, L and D scales. On Viper T scales the digital PCB and the LCD are separate units that can be replaced individually (see section 7.1 for dismantling instructions).

- Remove the LCD and back-light unit as described in the previous chapter.
- Remove the EPROM from its socket (Viper M and L scales with strain gauge load cells only). With Viper D scales and all scales with MonoBolc load cells the entire digital PCB inlcuding the soldered Flash Memory chip must be replaced if downloading the scale software via a computer fails for any reason (see section 7).
- Fit LCD and back-light unit onto the new digital PCB (chapter 7.3). Fit the EPROM (Viper M and L scales with strain gauge load cells only); see the notes in chapter 8.

7.5 Final reassembly

- Connect the RS232 cable and the cable from the analog PCB to the digital PCB (on Viper D scales also connect the cable of the numeric keypad membrane).
- Engage the display unit or the LCD module (Viper T) under the rear snaps of the display mounting plate and then lower its front edge until it snaps into place. Fit the retaining screw.

  Caution: On the Viper M the LC display is only held in the connector strip on one side. Because of this, for assembly the PCB, the display, and the backlighting must be held together with the hand, otherwise the backlighting may come out of the drilled holes in the PCB and be displaced!
- Install both EMC clamps (does not apply to Viper T).
- **Viper T scales only**: Attach all cables to the digital PCB and secure the board to the scale housing with the 5 screws.
- Replace the bottom plate and adjustable feet.

8 **Replacing the software** (Viper M and L scales with strain gauge load cells only)

The following description covers the **Viper M and L scales** with a plug-in EPROM on the digital PCB that may be replaced in order to update the software. **Viper D and T scales and all scales with MonoBloc load cells** are equipped with a Flash Memory chip allowing new scale software to be loaded from a computer (see section 7).

- Unscrew the adjustable feet and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.
- Undo the retaining screw which fastens the display unit to the mounting plate.
- Pull back the two front cantilever snaps holding the display unit to release it, raise the front edge of the display unit and withdraw it from the rear snaps.
- Disconnect the RS232 cable and the connecting cable to the analog PCB from the digital PCB. Remove the display unit.
- Remove the EPROM from its socket using a special tool.
- Fit the new EPROM. **Note**: the chamfered corner of the EPROM must be oriented towards the chamfered corner of the socket (marked with an arrowhead).
- Connect the RS232 cable and the cable from the analog PCB to the digital PCB.
- Engage the display unit under the rear snaps of the display mounting plate and then lower its front edge until it snaps into place. Fit the retaining screw.
- Mount the bottom plate and adjustable feet.

9 Replacing the load cell

9.1 Replacing a strain gauge load cell

Disassembly

- Remove the platter.

- **Scales without IP65 protection**: Undo the pan support plate retaining screws and remove the pan support plate.
- **Scales with IP65 protection** (see exploded view drawings in sections 2 and 3):
  - Undo the 4 M3 x 8 screws fastening the membrane to the load plate support.
  - Undo the two M6 x 30 retaining screws of the load plate support and carefully lift the load plate support off. Note: If the load plate support remains attached to the membrane, the membrane must be released with a thin pin. (Insert the pin through the drilled holes in the load plate and carefully press the membrane down.)
  - Undo the 3 M3 x 10 screws fastening the small flange to the membrane. Remove the small flange, the membrane, and the large flange.
  - Undo the 2 M3 x 8 fastening screws of the cover plate. Carefully lift off the cover plate together with the rubber seal.

- Turn the scale upside down, unscrew the adjustable feet and remove them.
- Undo the bottom plate retaining screws, removing them and the plate itself.

Replacing the load cell

- Remove the load cell cable connector from the analog PCB.
- Undo the 4 retaining screws for the overload plate. Remove the screws, washers and springs.
- Remove the overload plate with the load cell screwed to it.
- Remove the load cell retaining screws.
- Screw the new load cell to the overload plate. **Important**: Before tightening the screws, verify that the load cell is aligned exactly parallel with the edges of the overload plate! Screw torque: **10 Nm**
- Place the overload plate with the load cell screwed to it in the scale. Fit the springs and washers, then tighten the screws. **Important**: Pay attention to the color coding of the overload springs according to the table below!

Scale	Color of overload spring
Viper 7.5 lb (3 kg) small platform	red (blue on older versions)
Viper 12 lb (6 kg) small platform	red
Viper 24 lb (12 kg) small platform	yellow
Viper 24 lb (12 kg) large platform	white
Viper 75 lb (30 kg) large platform	brown
Viper 120 lb (60 kg) large platform	black

- Fit the load cell cable connector onto the analog PCB pins. Note: The color coding of leads on "LC" replacement cells is different from that of previous strain gauge cells.

Assembly

- Replace the bottom plate and the adjustable feet.

- **Scales without IP65 protection**: Turn the scale the right way up, replace the pan support plate and secure it with the screws. Before finally tightening the screws, make sure that the pan support plate is aligned squarely with the scale housing. **Important**: screw torque **10 Nm**!
- **Scales with IP65 protection** (see exploded view drawings in sections 2 and 3):
  - Mount the rubber seal and the cover plate and insert the 2 M3 x 8 fastening screws (but do not tighten them yet).
  - Lay the large flange on the cover plate, then lay the membrane in position and align the 3 fastening holes. Next, lay the small flange in position and align it exactly. Insert the 3 M3 x 10 screws and tighten them evenly together with the two M3 x 8 screws of the cover plate.
  - Align the large flange exactly on the 4 fastening holes of the membrane.
  - Lay the load plate support in position, and then insert the two M6 x 30 fastening screws and slightly tighten them. Before finally tightening the screws, make sure that the pan support plate is aligned squarely with the scale housing. **Important**: screw torque **10 Nm**!
  - To be able to screw the large flange and the membrane to the load plate support, the flange and the membrane must be lifted slightly, because the fastening screws are too short to reach to the threaded holes in the flange. To do this, proceed as follows:

    Carefully insert a fine screwdriver under the side of the large flange and lift the flange slightly together with the membrane. Insert one of the 4 M3 x 8 fastening screws in the corresponding drilled hole in the load plate support and screw it in only slightly. Insert the remaining 3 M3 x 8 fastening screws into the membrane and then tighten all 4 screws evenly.

    Note: Instead of using a screwdriver to lift the flange and membrane, this can also be done by temporarily inserting two M3 screws at least 15 mm long into two opposite holes in the load plate support and slightly tightening them. (These temporary screws are long enough to reach the threaded holes in the flange and to lift the flange together with the membrane). Insert two of the 4 M3 x 8 fastening screws into the free drilled holes in the load plate support and screw them in slightly. Undo the two temporary screws and insert the two remaining M3 x 8 screws in their place. Tighten all 4 screws evenly.

- Replace the platter.
- Calibrate and linearize the scale. If a load cell with another capacity has been installed, the new capacity must also be entered in the setup. Section 5 explains how to carry out these steps.

Note: Viper scales with strain gauge load cells have fixed cornerload stops that cannot be adjusted.

9.2 Replacing the MonoBloc load cell

Note: If a MonoBloc load cell is to be replaced, then the analog PCB must also be replaced at the same time as these components are a matching set (the analog PCB contains all TK data of the load cell). Both components are supplied together (temperature compensation data). After installing the new load cell, this printout must be stored in the scale (it is required if only the analog PCB is to be replaced, see chapter 6)!

9.2.1 Replacing the MonoBloc load cell of scales with small platforms

- Remove the platter (if present, also remove the draft shield).
- Carefully undo the retaining screw of the load plate support. **Note**: When loosening the screw, the load plate support must be held firmly as no force must be applied to it when turning!
- Remove the load plate support and the screw. Seal the threaded hole on the load cell with an adhesive strip so that the spring cannot fall out.
- Turn the scale upside down, unscrew the adjustable feet and remove.
- Undo the retaining screws of the bottom plate and remove this.
- Remove the load cell cable coming from the analog PCB. **Note: The plugs are only attached to the analog PCB by soldered joints, the cable must therefore be handled with care**!
- Undo the 4 retaining screws for the overload cell. Remove the screws and washers.
- Carefully lift out the cell from the scale. **Note**: The cell may only be held by the baseplate or by the back part of the block!
- Carefully disconnect the cable at the cell that connects the load cell with the analog PCB. **Note**: Care should be taken as there is a small connection PCB with fine wires on the load cell that must not be jolted! The PCBs are also sensitive to mechanical tension and pressure!
- Connect the cable to the new load cell.
- Carefully insert the new load cell in the scale and secure with the 4 screws (with washers).
  Note: torque: **2.8 Nm**.
- Connect both plugs of the load cell cable to the analog PCB. Slide the ferrite core on the load cell cable as near as possible to the separating wall of the housing.
- Replace the bottom plate and adjustable feet.
- Turn the scale the right way up, remove the adhesive patch from the threaded hole on the load cell and check to ensure that the spring is in the hole. Replace the load plate support and secure it with the hexagon screw. Before finally tightening the screw, make sure that the load plate support is aligned squarely with the scale housing. **Note**: Under no circumstances is the load plate support to be under any tension when turning the screw! Screw torque: **5 Nm**.
- Replace the platter (also mount the draft shield, if applicable).
- Calibrate and linearize the scale, then calibrate again. If a load cell with another capacity has been installed, the new capacity must also be entered in the setup. Section 5 explains how to carry out these steps.

Note: For Viper scales with small platforms and MonoBloc load cells, the cornerload and overload stops are permanently set and cannot be adjusted.

9.2.2 Replacing the MonoBloc load cell of scales with large platforms

- Remove the platter.
- Carefully undo the retaining screws of the load plate support. **Note**: When loosening the screw, the load plate support must be held firmly as no force must be applied to it when turning! Remove the load plate support and screws.
- Turn the scale upside down, unscrew the adjustable feet and remove them.
- Undo the retaining screws of the bottom plate and remove.
- Remove the plugs of the load cell cable coming from the analog PCB. **Note: The plugs are only attached to the analog PCB by soldered joints, the cable must therefore be handled with care**!
- Undo the retaining screws of the overload plate and remove them.
- Carefully lift out the overload plate together with the attached cell from the scale.
- Undo the 4 retaining screws of the load cell and carefully remove the overload plate.
- Carefully disconnect the cable at the cell that connects the load cell with the analog PCB. **Note**: Care should be taken as there is a small connection PCB with fine wires on the load cell that must not be jolted! The PCBs are also sensitive to mechanical tension and pressure!
- Connect the cable to the new load cell.
- Screw the new load cell to the overload plate. **Important**: Before tighening the screws, verify that the load cell is aligned exactly parallel with the edges of the overload plate. Screw torque: **4 Nm**!
- **Undo the locking screw of the overload protection and set the adjustment screw to a gap of 0.3 mm (use feeler gauge)**. **Retighten the locking screw**.
- Carefully attach the connection cable of the analog PCB to the cell.
- Carefully insert the overload plate with the attached load cell into the scale and secure with the 4 screws.
  Note: torque: **4 Nm**.
- Connect both plugs of the load cell cable to the analog PCB. Slide the ferrite core on the load cell cable as near as possible to the separating wall of the housing.
- Replace the bottom plate and the adjustable feet.
- Turn the scale the right way up, replace the load plate support and secure it with the screws. Before finally tightening the screw, make sure that the load plate support is aligned squarely with the scale housing. **Note**: Under no circumstance is the load plate support to be under any tension when turning the screw! Screw torque: **10 Nm**!
- Replace the platter.
- Calibrate and linearize the scale, then calibrate again. If a load cell with another capacity has been installed, the new capacity must also be entered in the setup. Section 5 explains how to carry out these steps.

Note: For Viper scales with large platforms and MonoBloc load cells, the cornerload stops are permanently set and cannot be adjusted.

Section 6

Repair of Viper terminals

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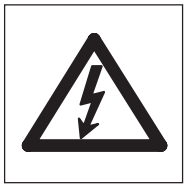
1 Important information

When performing repairs please refer to the exploded view drawings and lists of spare parts in section 4 of this manual. **Important**: After replacing components, a **functional check** of the terminal must always be carried out.

1.1 Safety and environment

Whenever repairs are carried out, the following **safety precautions** must always be taken:



- **The terminal must be disconnected from the power supply before repair work is started!**
- The terminal and the OptionPac contain electronic components which can be damaged by electrostatic discharges. **You must therefore always wear a grounded wriststrap when performing repair work.** Grounded wriststraps can be purchased from specialist electronics dealers.
- Defective components must be disposed of according to the instructions in section 1!

1.2 Tools and working aids

- Torx screwdrivers T10, T20, and T30
- Phillips screwdrivers sizes 0 and 2
- Insulated slotted-head screwdriver (with plastic-covered shaft), size 4
- Grounded wriststrap (to protect against electrostatic discharges)

1.3 Work instructions

Take great care when inserting and tightening screws into holes tapped **directly into the aluminum casting**: After inserting the screw, always turn it first about 1 turn counterclockwise until it engages in the existing thread, and only then screw it tight! Do not tighten the screw too much, since this may damage the thread in the aluminum casting!

2 Disassembling/reassembling the terminal

- Remove base plate from terminal or OptionPac (8 screws, Torx T20).
- **If OptionPac is installed**: Disconnect all cable connections between OptionPac and terminal in OptionPac. **Tip**: Note where cables are connected. Unfasten OptionPac from terminal (4 Phillips screws) and lift off.
- Reassemble in reverse order.

3 Replacing the keypad overlay

- Lift the defective keypad overlay by a corner and gently peel it off.
- Carefully remove all traces of adhesive with, for example, a wooden or plastic scraper. **Caution**: Make sure not to damage the keypad membrane of Viper RD and RT terminals!
- Carefully clean the windows of the keypad overlay and the display mounting plate.
- Peel off protective film from new overlay.
- Center the keypad overlay on the display mounting plate and press down uniformly.

4 Replacing the AC adapter

Note: The AC adapter has a fuse as overcurrent protection. For safety reasons this fuse cannot be replaced, and the AC adapter must therefore be completely replaced if the fuse blows or the AC adapter is defective.

- Open terminal, remove OptionPac (if present) (chapter 2).
- Peel output cable of AC adapter off analog board. **Battery-operated scales only:** The output cable of the AC adapter is plugged into the charging circuit board of the OptionPac and is usually already removed when the OptionPac is disassembled (chapter 2).
- Remove **AC adapter** from wall of housing (attached by adhesive patch). If necessary, carefully insert a flat blade (knife or screwdriver) between AC adapter and housing and detach AC adapter. Remove all traces of adhesive from housing.
- Undo the 6 screws holding the RS connector plate in place (rear panel of terminal) and remove the plate. (**Take care:** cable connections!).
- Remove power cord grommet of AC adapter from RS connector plate. Remove AC adapter from terminal.
- Attach new adhesive patch to housing wall and peel off protective film.
- Place new AC adapter in terminal and press onto adhesive patch.
- Locate the power cord grommet (with its closed side facing up!) in the center of the blanking plate slot, then press the grommet down thoroughly. This requires a fair amount of force which is intended as it ensures proper IP protection. **Caution: Never use a hammer or similar tool for pushing the grommet into place because this may damage the wires!** Once the grommet is properly located in the slot you may fasten the blanking plate.
- Plug AC adapter output cable onto analog board. **Battery-operated terminals**: The output cable of the AC adapter must be plugged onto the charging circuit board in the OptionPac.
- Install terminal/OptionPac (chapter 2).

5 Replacing the analog board

- Open terminal, remove OptionPac (if present) (chapter 2).
- Disconnect the load cell connection cable and all other cable connectors from analog board. **Tip**: Make a note of the cable connections!
- Pull off the spring clip amd the EMC clamp from the analog board and remove it.
- Fit new analog board and fasten in place with the spring clip and the EMC clamp.
- Plug the load cell connection cable and all other cable connectors onto the analog board.
- Close terminal, mount OptionPac (if present) (chapter 2).

Note: **After replacing the analog board all scale data and user settings must be reentered, because they are saved in the EAROM on the analog board! When they have been reentered, the weighing system must be calibrated/linearized**. These operations are described in section 7 of the this service manual.

6 Replacing the display mounting plate, display unit, and digital board

The display mounting plate is located underneath the keypad overlay and is located in the scale housing by 6 snaps. The display unit comprises the digital PCB, the liquid crystal display (LCD) and the back-light unit (on the Viper RT terminal the lighting is integrated into the LCD module). It is held in place on the mounting plate and the housing by snaps and screws. The digital PCB is connected to the analog PCB and the RS232C interface by two ribbon cables (on Viper RD and RT terminals there is an additional cable for the keypad and the Viper RT has another flat ribbon cable for the additional interfaces).

6.1 Preliminary work

- Open terminal, remove OptionPac (if present) (chapter 2).
- **Viper RM, RL and RD**: undo the two screws (Torx T10) fastening the digital board to the display mounting plate.

  Viper RT: undo the four screws (Torx T10) fastening the digital board to the terminal housing.
- **Viper RM, RL and RD only**: push back the two (small) black snaps at the front of the display mounting plate and slowly raise the digital board until it is vertical. Carefully pull the digital board vertically upward and out of the rear snaps.
- Disconnect all cables from the digital board, then remove the board. **Tip**: Make a note of the cable connections.
  Spider RD and RT terminals only: The membrane cable for the keypad of the Viper RD (numeric keypad) and Viper RT (entire keypad) must also be disconnected from the digital board. Use a soft felt pen to mark first the membrane cable and then the plug, so you know afterwards how the cable has to be plugged in. Then slightly pull out the two small black snaps on the left and right of the plug. This releases the spring mechanism of the plug, and the cable can be pulled off.
- **Viper RT only**: Unfasten the two mounting screws fixing the LCD module to the display insert and to the terminal housing. Push the front retaining clips on the LCD module forward slightly, swivel the module up and pull it out from the rear brackets.

6.2 Replacing the display mounting plate

Note: In order to replace the display mounting plate, the keypad overlay must be removed. This cannot be reused, and must therefore also be replaced. On Viper RD and RT terminals the membrane keypad, which is fastened to the display mounting plate, must also be replaced.

- Remove keypad overlay (chapter 3).
- Push the 3 cantilever snaps at the front edge of the display mounting plate inwards to release the plate and remove it to the front.
- Insert the new display mounting plate into the aperture so that it clicks into place.
- **Spider RD and RT terminals only**: Peel the protective film off the new membrane keypad and carefully apply the membrane keypad to the display mounting plate. Pass the membrane cable through the aperture and into the inside of the terminal.
- Apply the new self-adhesive eypad overlay (chapter 3).

6.3 Replacing the liquid crystal display (LCD) and/or the back-light unit

The following steps apply only to Viper RM, RL and RD terminals. On Viper RT terminals the entire LCD module must be replaced where applicable (see chapter 6.1 for dismantling instructions).

- Place the display unit with the digital board downwards on a conductive CMOS film.
- Unplug the back-light ribbon cable from the digital board.
- Carefully insert a flat-bladed screwdriver (size 4) between the digital board and the back-light unit immediately adjacent to the connectors. **Tip**: Use an electrician's screwdriver with an insulated shaft as this reduces the risk of causing damage.

- Use the screwdriver to pry the liquid crystal display and the back-light unit out of the socket strip(s). **When doing this, lever the shaft of the screwdriver against the edge of the digital board. Never lever the tip of the screwdriver against the surface of the board, as this could damage the board!**
- Peel off the upper protective film of the new back-light unit.
- Place the new back-light unit onto the digital board. Two of the four feet of the back-light unit are in the form of pins. These pins must be inserted into the corresponding holes in the digital board.
- Peel the upper and lower protective films off the new LCD.
- Carefully place the LCD onto the back-light unit and ensure that the contact pins are correctly aligned with the socket strip(s). When correctly positioned, the ends of the LCD and the back-light unit are flush. Use a flat object such as a ruler to exert a uniform pressure on the LCD and gently push it home.
- Push the back-light unit ribbon connector onto the digital board pins.

6.4 Replacing the digital board

The following steps apply only to Viper RM, RL and RD terminals. On Viper RT terminals the digital PCB and the LCD are separate units that can be replaced individually (see chapter 6.1 for dismantling instructions).

- Remove the LCD and backlighting unit as described in the previous chapter (6.3).
- **Viper RM and RL terminals**: Use a suitable tool to remove the EPROM from its socket and place it on the new digital board. The chamfered corner of the EPROM must be aligned with the chamfered corner of the base (see marking)! Follow the instructions given in section 7.

  Viper RD and RT terminals: After the digital board has been replaced, the application software for the terminal must be loaded into the flash memory of the digital board from the PC (see section 9 of this service manual). If downloading the terminal software via a computer fails for any reason, the entire digital PCB inlcuding the soldered Flash Memory chip must be replaced .
- **Viper RM, RL and RD terminals**: Mount the LCD and backlighting unit on the new digital board (chapter 6.3).

6.5 Final reassembly

- Connect all cables to the digital board (incluning the membrane keypad cable on Viper RD and RT terminals).

  Viper RD and RT terminals only: The membrane cable for the keypad must also be plugged into the digital board. To do so, pull out the two small black snaps on the left and right of the plug. Then push the membrane cable into the plug as far as the stop, hold it in this position and push the two snaps against the plug. The cable is then held fast.
- Engage the display unit or the LCD module (Viper RT) under the rear snaps of the display mounting plate and then lower its front edge until it snaps into place. Fit the retaining screws.
- Install both EMC clamps (does not apply to Viper RT).
- **Viper RT terminals only**: Secure the digital board to the scale housing with the 4 screws.
- Install the terminal/OptionPac, if present (chapter 2).
- Replace the bottom plate and secure with 8 screws.

7 Replacing the software (Viper RM and RL terminals only)

The following description relates to **Viper RM and RL terminals**, which have a plug-in EPROM on the digital board. The software can be updated by replacing the EPROM. **Viper RD and RT terminals** have a **flash memory chip** which makes it possible to update the terminal software from a PC (see section 9 of this service manual).

- Remove digital board (chapter 6.1) and place on a conductive CMOS film.
- Using a suitable tool, remove the EPROM from its socket.
- Fit the new EPROM. **Note**: The chamfered corner of the EPROM must be aligned with the chamfered corner of the socket (see marking)!
- Install the digital board (chapter 6.5).

8 Repairing the OptionPac

8.1 Replacing the battery

Note: This section relates only to terminals which have an OptionPac with built-in battery.

- Remove the base plate of the OptionPac (8 screws, Torx T20).
- Remove battery from wall of housing (attached by adhesive patch). If necessary, carefully insert a flat blade (knife or screwdriver) between battery and housing, then release AC adapter. Remove all traces of adhesive from housing.
- Lift battery out of OptionPac and pull off cable connecting to charging circuit board.
- Plug the cable from the charging circuit board into the new battery (+ = red cable, – = blue cable).
- Fasten adhesive patch to wall of housing, peel off protective film, place battery in OptionPac and press latter against wall of housing.
- Check all cables are correctly laid. The cables must lie in the correct recesses in the housing so they are not trapped by the base plate.
- Screw the base plate of the OptionPac on again.

8.2 Replacing the charging circuit board

Note: This section relates only to terminals which have an OptionPac with built-in battery. The charging circuit board has an electronic overload protector which automatically resets after being activated.

- Remove base plate of OptionPac (8 screws, Torx T20).
- Pull off cable from battery (blue plug), then remove the two snap fasteners of the charging circuit board and carefully lift the board out of the housing.
- Undo all cable connections on charging circuit board.
- Plug cable onto new charging circuit board and place board in housing.
- Fasten board with the two snap fasteners and plug cable into battery (blue plug).
- Screw base plate of OptionPac on again.

8.3 Replacing the analog option board

Note: This section relates only to terminals fitted with an OptionPac containing the analog option for connecting a second weighing platform.

- Remove base plate of OptionPac (8 screws, Torx T20).
- Undo all cable connections on the analog option board. **Tip**: Make a note of the cable connections.
- Undo the 4 screws fastening the board (Torx T10) and remove the board.
- Using a suitable tool, remove the EPROM from its socket .
- Fit the new EPROM. **Note**: The chamfered corner of the EPROM must be aligned with the chamfered corner of the socket (see marking)!
- Place new board in housing and fasten with screws.
- Plug in all cables on the analog option board.
- Screw the base plate of the OptionPac on again.

Note: **After the analog option board has been replaced, all the data and user settings for the second weighing platform must be reentered, because these are stored in the EAROM on the board! The second weighing platform must then be calibrated and linearized.** These steps are described in section 7 of this service manual.

Section 7

Technician setup

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1 Introduction

The setup of the Viper scales and terminals includes a special section dedicated to the technician. The technician setup offers settings and procedures for maintenance and diagnostics. Accessing this part of the setup requires a special password while navigation within the technician setup is the same as with the user and supervsior setup (see Operator Manual). The setup structure for Viper M/RM, L/RL and D/RD scales and terminals is different from that for Viper T/RT models, so the respective menus are described separately. **Caution**: Settings may only be made by qualified personnel. The wrong settings could result in the scale or terminal not functioning correctly! .

2 Accessing and using the technician setup

2.1 Accessing the technician setup of scales or terminals that are not certified

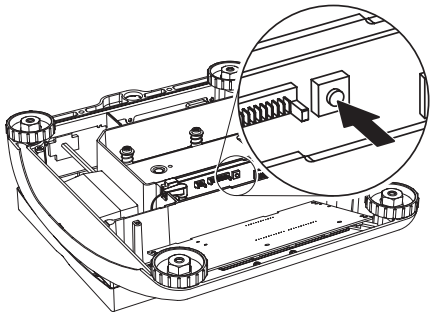
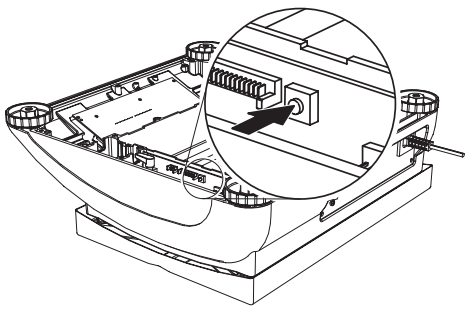
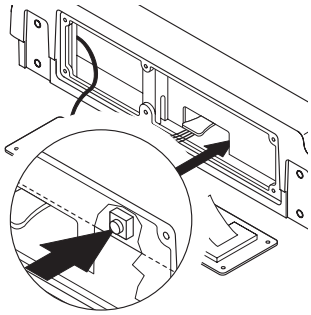
- Press the «**Print**» key and hold it down until the prompt to enter the password appears ("Code").
- Enter the Technician password and confirm with «**Print**». At the factory, the password for the technician has been set to «**Zero**» «**Tare**» «**Zero**» «**Tare**» («→0←«→T←«→0←«→T←

Once you have confirmed the password, the first setup block appears ("SCALE"). Basically, the technician setup is the same as the one for the supervisor (see Operator Manual) except that there are some additional blocks for setup and diagnostics.

2.2 Accessing the technician setup of certified scales or terminals

With certified or certifiable scales and terminals, direct access to the technician setup is blocked. This is for technical reasons, and also to comply with regulations. To access the technician setup, proceed as follows:

- Switch off the scale or terminal.
- Remove the bottom plate of the scale or the RS connector plate on the rear of the terminal by undoing the retaining screws. **Important**: In order to remove the bottom plate or the RS connector plate it is necessary to break the **certification seal** affixed to them! **Once this seal has been destroyed, the scale must be recertified by an accredited organization, and a new certification seal must be affixed before the instrument may be used as a certified scale again (for more information on certification please refer to chapter 5)!**
- Hold down the service switch (pushbutton) on the analog PCB (indicated by an arrow in the drawings below), while at the same time switching on the scale or terminal. Keep the service switch pressed in until "SCALE" appears in the display.

small platform model	large platform model	terminals
		

3 Technician setup of Viper M/RM, L/RL and D/RD scales and terminals

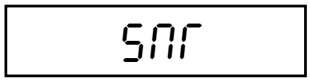
The overview below shows the setup blocks holding additional settings dedicated to the technician ("SCALE", "TERMINAL" and "DIAGNOSTICS"). The settings available to the technician only are printed in **boldface**. The further setup blocks ("APPLICATION" and "COMMUNICATION") are similar to the ones in the supervisor setup (see Operator Manual) and are not shown below. The factory settings are marked with an asterisk (*).

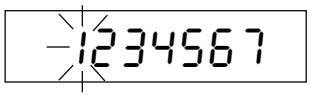
Level	*Level 2*	*Level 3*	*Level 4*	*Level 5*
SCALE	Scale 1	**SNR**		
		Metrology [4]	**NTEP** **None**	
		Build [4]	**Unit** **Capacity** **Resolution** **Verification Interval**	**lb*, g, kg, oz** **0 ... 9999** **0.00001 ... 0.002** **e = d*, e = 10d**
		Linearization [4]		
		GEO value [4]	**0 ... 16* ... 31**	
		Calibration [4]		
		Units	Displayed 2nd	lb*, g, kg, oz lb, g, kg*, oz
		Tare	Pushbutton Chain Tare Auto Tare Auto Clear Tare	On*, Off On*, Off On, Off* On, Off*
		Zero	Auto Zero Mode (AZM) Auto Capture Pushbutton Zero	Off, Gross*, Gross/Net ±2%, ±10%*, Off ±2%, ±10%*, +20/–2%, Off
		Filtering	Low, Medium*, High	
		SCALE Reset	Sure?	
	Scale 2	Scale Type	Analog [1], SICS, None*	
		Mode	Reference, Bulk*	
TERMINAL	Device	Sleep	On, Off*	
		Backlight	On*, Off	
		Beeper [2]	On, Off*	
	Date/Time [2]	Date Format	US*, EU	
		Date	xx-xx-xx	
		Time	xx-xx-xx	
		AM/PM		
		Timeout	x (days, factory setting: 0)	
	Bargraph [3]	On*, Off		
	Access	User	On*, Off	
		Codes	Supervisor Code	Enter code Retype code
			Technician Code	**Enter code** **Retype code**
DIAGNOSTICS	**Keyboard**	**Test**		
	Scale	**X10**		
	List			
	General reset	**Sure?**		

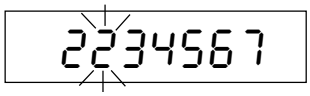
1) After this option has been activated, the same settings are available as for "Scale 1".
2) Not available with Viper M/RM and L/RL. 3) Not available with Viper M/RM.
4) On scales declared to be certifiable this menu option is available only if the technician setup is launched via the service switch (chapter 2.2).

3.1 Scale settings and calibration ("SCALE")

3.1.1 Viewing or changing the serial number





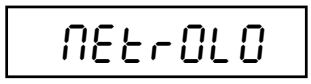


In this block you can view or change the serial number of the scale or terminal.

- Press the «**Print**» key to display the serial number. It is only necessary to change this number after replacing the analog PCB or rectifying "Error 53". The serial number is given on the type plate of the scale or terminal.
- To enter a new number, press the «**Tare**» key. The cursor appears as a small line at the left where the first digit is. This digit (if there) starts to flash. Now press the «**Tare**» key repeatedly until the desired digit is displayed. If you want to leave this position empty, make sure that only the cursor is displayed. Confirm the digit by pressing the «**Print**» key. The cursor then moves to the second position, which you can change in the same way. This also applies for all the following positions (maximum of 7 digits).

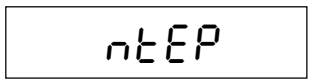
  Note: With Viper D scales and Viper RD terminals the serial number can be entered directly via the numeric keypad.
- To quit this block, press the «**Print**» key again after entering the last digit.

3.1.2 Certification status

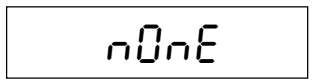


In this block you specify whether the scale is certifiable or not. **Caution**: If you declare a scale to be certifiable various scale settings are no longer available and direct access to the technician setup is blocked (see chapter 2.2)!

- Press the «**Print**» key to display the current certification approval status:



  – certifiable scale ("NTEP")

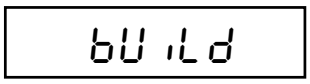


  – scale not certifiable ("none")

- Select the desired setting with the «**Tare**» key and confirm it with the «**Print**» key.

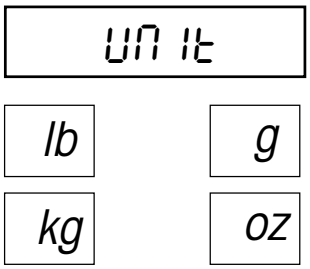
Note: Chapter 5 outlines the procedure required for preparing a weighing system for certification.

3.1.3 Entering scale data



This block contains 3 subblocks ("Unit", "Capacity" und "Resolution) used to set up the base unit, the weighing range and the resolution of the scale.

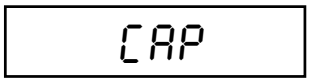
Selecting the base unit



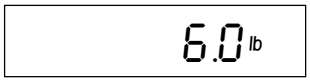
- Use the «**Tare**» key to select the desired base unit, then confirm by pressing the «**Print**» key. The base unit is used for specifying the weighing range and resolution of the scale and has nothing to do with the weighing unit used in daily operation (which may be selected separately, see Operator Manual). The base units available are shown opposite.

Note: With certifiable scales only "lb" and "kg" are available.

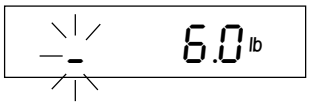
Specifying weighing range



The weighing range must be specified when building a new scale using a Viper terminal.
Furthermore, if the analog PCB is replaced, it is necessary to specify the weighing range, because the EEPROM on the PCB is set to a default value at the factory. With Viper scales the weighing range is shown on the plate above the display and must be set to this value. It is also necessary to set the weighing range if a load cell of a different capacity is installed. In this case the weighing range must be set in accordance with the load cell used (see specifications in section 8).



- If you want to specify the weighing range, press the «**Print**» key to display the range currently selected (or the factory-set default weighing range if the analog PCB or EEPROM has been replaced). The value uses the selected base unit.

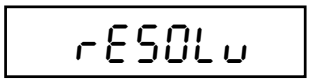


- To enter a new weighing range, press the «**Tare**» key. The cursor appears as a small line at the left where the first digit is. This digit (if there) starts to flash. Now press the «**Tare**» key repeatedly until the desired digit is displayed. If you want to leave this position empty, make sure that only the cursor is displayed. Confirm the digit by pressing the «**Print**» key. The cursor then moves to the second position, which you can change in the same way. This also applies for all the following positions (maximum of 7 digits).

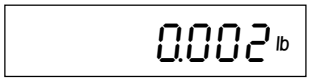
  Note: With Viper D scales and Viper RD terminals the weighing range can be entered directly via the numeric keypad.

- To quit this block, press the «**Print**» key again after entering the last digit.

Setting the resolution

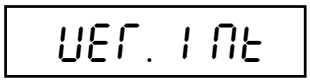


The resolution must be specified when building a new scale using a Viper terminal. Furthermore, if the analog PCB is replaced, it is necessary to specify the resolution, because the EEPROM on the PCB is set to a default value at the factory. With Viper scales the resolution is shown on the plate above the display and must be set to this value. It is also necessary to set the resolution if a load cell of a different capacity or type (e.g. MonoBloc instead of strain gauge cell) is installed. In this case the resolution must be set in accordance with the load cell used (see section 8).



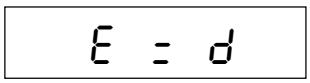
- Use the «**Tare**» key to select the desired resolution, then confirm by pressing the «**Print**» key. **Notes**: The settings available depend on the weighing range and are displayed in the selected base unit. With Viper D scales and Viper RD terminals the resolution can be entered directly via the numeric keypad.

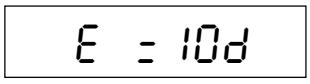
Setting the certified resolution



This block is available with MonoBloc scales only and it is not available with Viper terminals!

This setting is only required (and effective) for certifiable scales (chapter 3.1.2).

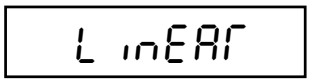




- Use the «**Tare**» key to select the desired certified resolution, then confirm by pressing the «**Print**» key. Resolutions "e = d" (default setting) and "e = 10d" are available.

Note: If the resolution is set to "e = 10d", then the last decimal place of the weighing result is shown in brackets ("parentheses"). These indicate that the last decimal position is not considered for the calibration tolerance. If the resolution is set to "e = d", then the weighing result is shown without parentheses.

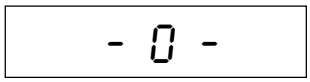
3.1.4 Correcting linearity errors

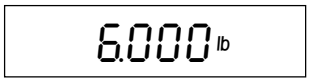


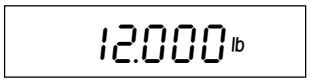
Correct calibration ensures that the displays at the zero point and the calibration point correspond exactly to the loads placed on the scale. Ideally, this should be the case over the entire weighing range. Any linearity error is corrected in the factory. Normally, repeat linearization is only necessary after replacing the load cell or changing the weighing range. For Viper scales with strain gauge load cell and for Viper terminals a 3-point linearization procedure is available (set calibration points at 0%, 50% and 100% of the weighing range). In case of Viper scales with MonoBloc load cell, the linearity correction is a 5-point procedure with the calibration points being at 0%, 25%, 50%, 75% and 100% of the weighing range. **Note**: The set calibration points can be changed if the required weights are not available.

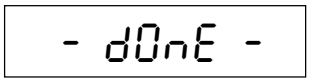
Notes:

- The weights used for linearization are displayed in the standard weighing unit used in daily operation ("SCALE" –> "Units" –> "Display").
- If no valid calibration values are available ("Error 6"), linearization is not possible. In this case the scale must be calibrated first.
- It is strongly recommended that the scale is again calibrated after linearization!
- Linearization can be aborted at any time by pressing the «**On/Off**» key.





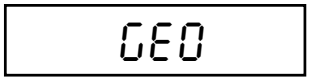


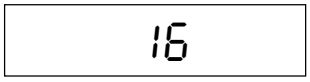


- Press the «**Print**» key if you want to linearize the scale. The flashing "- 0 -" display prompts you to remove the load from the platter. Once this is done, zero point adjustment is carried out automatically.
- The second setting point (e.g. 6 lb for a 12 lb scale with strain gauge load cell) now appears in the display. If you have this weight available, place it on the scale. If not, you can use the «**Tare**» key to change the linearization point and then place the corresponding weight on the scale. Adjustment is then carried out after the «**Print**» key is pressed.
- The third setting point (e.g. 12 lb for a 12 lb scale) then appears in the display. This value can also be changed with the «**Tare**» key, if necessary. Place the appropriate weight on the scale. Adjustment is again carried out after the «**Print**» key is pressed.

  The message "done" appears in the display, indicating that the linearization procedure has been successfully concluded.

3.1.5 Setting geographical adjustment value



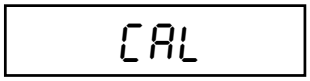


In this block you can set the geographical adjustment value and thus adapt the scale to local gravitational conditions. Please only change this setting if you are certain of the correct geographical adjustment value!

- Press the «**Print**» key to display the current geographical adjustment value (default setting is 16). Then press the «**Tare**» key to change it. Each time the key is pressed, the next value is displayed (range of settings: 0 - 31). Please refer to the table in section 8 to find the appropriate geographical adjustment value. Confirm the selected value by pressing the «**Print**» key.

Caution: The geographical adjustment value must not be readjusted after calibration as this will turn the calibration values invalid!

3.1.6 Calibration

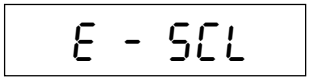


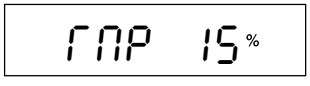
Notes:

– The weights used for calibration are displayed in the standard weighing unit used in daily operation ("SCALE" –> "Units" –> "Display").

– The geographical adjustment value should be checked before calibration and correctly set if necessary (chapter 3.1.5). Do not change the geographical adjustment value after calibration!

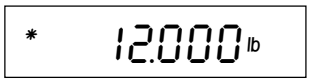
– Calibration can be aborted at any time by pressing the «**On/Off**» key.





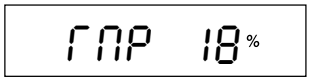
- Press the «**Print**» key if you want to calibrate the scale. You are now prompted to remove any weight from the platter ("Empty Scale"). Once the platter is empty press the «**Print**» key to continue the calibration procedure.

  While the zero point is being determined, the output signal of the analog/digital converter appears in the display.

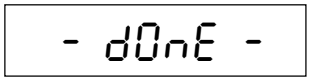


- You are now prompted by the display to calibrate your weighing system at that value which you have specified as weighing range (see chapter 3.1.3, "Capacity").

  If you do **not** want to calibrate with this value (e.g. because you do not have sufficient weights available), press the «**Tare**» key repeatedly until the desired calibration weight appears in the display (the calibration weight is reduced every time the key is pressed). **Note**: it is generally recommended to calibrate the scale **at full load.** This applies especially to **certifiable scales**.



- Place the selected calibration weight on the scale and confirm it with the «**Print**» key. Again, the output signal of the analog/digital converter appears shortly in the display.

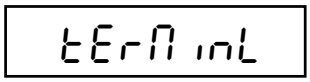


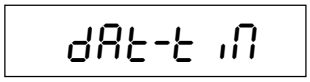
The message "done" appears in the display to confirm that calibration has been successfully concluded.

3.2 Device settings ("TERMINAL")

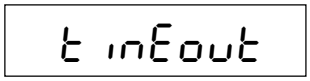
3.2.1 Defining a timeout

In this menu you can limit the period of time for which the scale is used. This is particularly useful for leased scales, since it prevents the scale for being used for longer than the agreed period.





- Launch the "Date/Time" section of the "TERMINAL" main block.

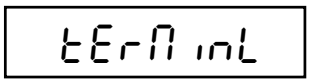


- In the "Timeout" subblock you can enter the number of days (1 – 999) for which the scale can be used. If you enter "0" there is no restriction on the period of use of the scale (this is the factory setting).

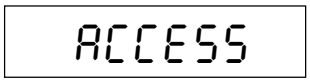
  The period of use commences from the start of the next day. Once the preset period of use has expired, the scale will still start up but will not perform any measurements and instead displays a message stating that the period of use has expired.

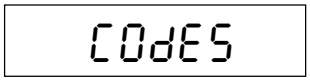
3.2.2 Changing the technician password

At the factory, the password for the technician has been set to «**Zero**» «**Tare**» «**Zero**» «**Tare**». We recommend you to replace this password with one of your own as soon as possible following the procedure explained below.

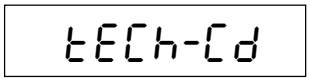


- Launch the "Access" section of the "TERMINAL" main block.

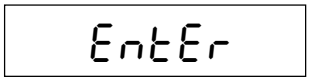




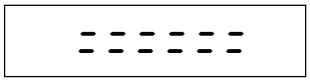
In the "Codes" subblock you can specify your own technician password. Proceed as follows:



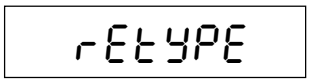
- Call up the subblock "Tech-Cd" ("Technician Code") and …



- … you will be prompted to enter your new password. Enter the sequence of keystrokes you wish to use as your password. You can use up to 6 keys. **Important**: The «**Print**» key cannot be used in the password! Do not press this key, as it is used to terminate input and confirm the new password!



- Each keystroke is symbolized in the display by two double horizontal dashes. Confirm the new password by pressing the «**Print**» key.

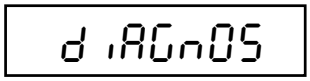


- You will now be prompted to enter the password again. Retype the new password and confirm it again with the «**Print**» key.

Definition of the password is now complete, and the next time you attempt to enter the setup mode you will be asked for it.

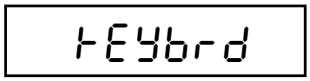
Important: Make a note of your new password! If you forget it, you will need to use the backdoor password to get access to the technician setup. The backdoor password can be found on the very last page of section 8 of the current manual. Remove this page from the Service Manual and keep it in a safe place.

3.3 Diagnostic functions ("DIAGNOSTICS")

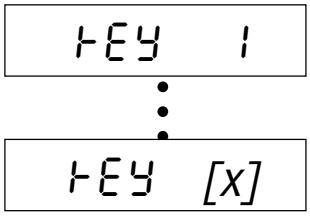


The main setup block "DIAGNOSTICS" provides 3 additional blocks for verifying and resetting the scale or terminal.

3.3.1 Diagnostic functions for keypad and display ("Keyboard")

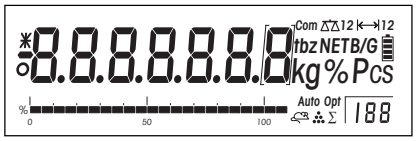


Within this setup block you may check proper **functioning of all keys and the display**.



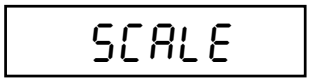
You are prompted to press all keys, one after the other (6 keys for Viper M/RM, 10 for Viper L/RL and 25 keys for Viper D/RD scales or terminals).

- Press the required keys in sequence. If a key is working properly the display jumps to the next key.

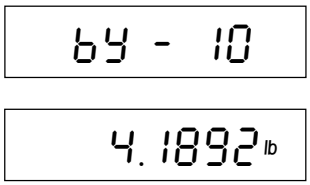


After the last key has been pressed all segments of the display light up. Make sure all segments are visible.
Pressing any key aborts the display test.

3.3.2 Increasing the resolution ("Scale" --> "by 10")

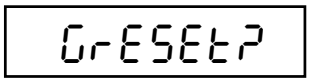


Within this setup block you may temporarily **increase the resolution of the displayed weighing result** by a factor of 10.



- Press the «**Print**» key and the weighing result will be displayed with an additional digit. This mode is used only for verifying the current weight at high resolution, all keys are inactive. Pressing any key aborts the high resolution display and returns you to the setup.

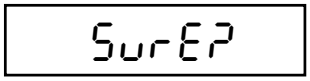
3.3.3 Resetting all settings to the factory default ("General Reset")



In this setup block you can reset **all menu settings** of the scale or terminal to their factory settings.

Caution: Use this option with care and only if you are absolutely sure that you want to reset all settings. You will loose all individual settings established by the user and the supervisor with the exception of passwords and access privileges ("TERMINAL" –> "Access"). However, the settings available to the technician only will not be reset (scale data, calibration values, etc.).

- Press the «**Print**» key to reset the settings. If you do not want to reset the settings press «**Tare**» instead.



You are asked again whether you really want to reset the settings.

- If you want to reset, press the «**Print**» key again. Otherwise, press the «**Tare**» key, because this is your last chance to cancel the reset. When you press the «**Print**» key as confirmation, all settings are reset and the scale or terminal immediately operates with the factory settings.

3.4 Operating the Viper M/RM, L/RL and D/RD setup via the interface

The setup of the Viper scales and terminals can be operated using the built-in RS232C interface. However, a computer with a simple terminal emulation software is required. **Note**: For certified weighing systems, access to the setup via the interface is locked!

On **Viper Ex scales** remote access to service mode is only available using the PSU power supply unit.

Requirements

The following conditions must be fulfilled for communication between scale or terminal and computer:

- The scale or terminal must be connected to the RS232C interface of a computer via an appropriate interface cable.
- The interface of the scale or terminal must be set to the "SICS" operating mode.
- A communications program must be installed on the computer (e.g. "Hyper Terminal").
- The communications parameters (protocol, bits, pararity, transmission rate) for the scale/terminal and communications program must be the same.

Accessing the setup

- Enter the command "KAS" (capitals) in the communications program and confirm with <**CRLF**> («Enter», «Return» or «↵ key, depending on the keyboard). The first block of the setup ("SCALE") is shown on the screen.

Operating the setup

- The setup can be operated using either the computer keyboard or the keys on the scale or terminal.
- The operating procedure using the keyboard is identical to that of the keys on the scale or terminal (YES/NO prompts):
  - Confirm with "**y**" (lower case), corresponding to the «**Print**» key of the scale or terminal ("YES")
  - The "**n**" (lower case) corresponds to the «**Tare**» key of the scale or terminal ("NO").
- The <**ESC**> key quits the setup and saves the settings. The <**ESC**> key may also be used to abort running procedures such as calibration and linearization.
- Numerical input via the computer keyboard is possible only in the setup mode blocks for the serial number ("SNR") and for the weighing range ("CAPACITY"). All other numerical values must be entered in the same way as they would be when using the keys of the scale or terminal.
- Setup blocks as well as settings are shown at the same time on the scale/terminal and the computer screen.
- For certified weighing systems, only those blocks in setup are accessible that can also be accessed with the keys of the scale or terminal. The technician setup is locked for weighing systems.
- After entries in setup have been completed, the scale/terminal interface should be reset to the settings required for normal weighing operation.

SICS command set

As well as using the interface to operate in the service and master modes, the Viper scales and terminals also support the command set **MT-SICS** (**M**ettler-**T**oledo **S**tandard **I**nterface **C**ommand **S**et). SICS commands are implemented according to "Level 0" and "Level 1". Detailed information on interface commands are found in the "MT SICS Reference Manual" (No. 705184).

Standard commands are available as well as scale-specific SICS commands which support product-specific characteristics. One of these is the "ITK" command for loading temperature-compensation data of a MonoBloc load cell into the EEPROM of the analog PCB. This is necessary with MonoBloc scales if the load cell and the analog PCB are not a matching pair because they have been replaced individually (see section 7 for further details).

4 Technician setup of Viper T scales and Viper RT terminals

The following overview shows the setup menu blocks in which additional settings are available for technicians ("SCALE" and "TERMINAL"). Settings that are only available to technicians are printed in **bold**. The other menu blocks ("APPLICATION", "COMMUNICATION" and "DIAGNOSTICS") correspond to those for the supervisor (see operating instructions) and are not shown here. Factory settings are indicated by *****.

Level 1	*Level 2*	*Level 3*	*Level 4*
SCALE	**Metrolo**	**no Appr** **OIML** **NTEP**	
	Scale 1/Scale 2	*[Select]*	
	Ramp		
	Serial Number		
	Scale Build	**Scale Type**	**Single Range**
		Base Unit	**g, kg*, t, lb, oz**
		Ver. Interval	**e = d*, e = 10d**
		Scale Cap. 1	*[Enter]*
		Resolution 1	**1200d ... 35000d**
	Geo Value	**0 ... 31**	
	LIN-CAL	**3 Point**	*[Start]*
		5 Point	*[Start]*
	Calibration	*[Start]*	
	Control Mode		
	Display	Unit 1	g, kg, t, lb*, oz
		Unit 2	g, kg*, t, lb, oz
		Resolution	1200d ... 175000d
	Tare	Auto Tare	On, Off*
		Chain Tare	On*, Off
		AutoClr Tare	On, Off*
		Pushb. Tare	On*, Off
	Zero	**Zero Capt.**	**–2%/2%, –2%/18%***
		Set Zero	*[Start]*
		Auto Zero	On*, Off
	Restart	On*, Off	
	Filter	Vibration	Low, Mid*, High
		Process	Universal*, Filling
	Reset	*[Start]*	

Level 1	*Level 2*	*Level 3*	*Level 4*
TERMINAL	Device	Language	English, US English, German, French, Italian, Spanish
		Sleep	Off*, 1 min., 3 min., 5 min.
		Contrast	0 ... 5* ... 10
		Invert	Yes*, No
		Weight Display	small*, big
		Date Time	Date Format EU, US
			Date *[Enter]*
			Time *[Enter]*
			AM*, PM
		Beep	Off*, On
	Access	Supervisor Password	*[Enter code], [Retype code]*
	Timeout	**Not active***	
		Days	**1 ... 999**
	Reset	*[Start]*	

Only the settings and procedures for the "SCALE" and "TERMINAL" menus that are available exclusively to service technicians are described here. The other menu options are described in the operating instructions.

4.1 Admissibility for certification (*SCALE –> Metrology*)

The following settings are available:

"no Appr" Scale is not suitable for certification

"OIML" Scale is suitable for certification to OIML

"NTEP" Scale is suitable for certification to NTEP

Please note: If a scale is declared suitable for certification, a number of scale settings are no longer available. In addition, direct access to the technician setup is blocked (see chapter 2.2)!

Note: Chapter 5 outlines the procedure required for preparing a weighing system for certification.

4.2 Selecting the scale to be configured (*SCALE –> Scale 1/Scale 2*)

Here you specify which scale you want to configure. This option is only available for two-scale systems, i.e. when the scale or terminal has an analog option for connecting a second weighing platform.

The same menu blocks that are described in the sections below are available for both scales in the technician setup.

4.3 Querying the value of the analog/digital converter (*SCALE –> Ramp*)

The percentage deflection of the analog/digital converter ("Ramp") can be displayed in this menu. This value can be used to determine whether the load cell is operating correctly. Scales with identical and correctly operating load cells have roughly the same ramp values. The value is dynamic and changes with the load.

4.4 Serial number of the scale or terminal (*SCALE –> Serial Number*)

The 7-digit serial number of the scale or terminal can be displayed or changed in this menu. Note: the number should only be changed or reentered when necessary (e.g. after installing a new scale PCB).

4.5 Entering configuration data (*SCALE –> Scale Build*)

This menu includes a number of different submenus for entering configuration data for the weighing system. These submenus are described in the following sections:

Defining the scale type ("Scale Type") —> Chapter 4.5.1

Specifying the base unit ("Base Unit") —> Chapter 4.5.2

Choosing the verification interval ("Verification Interval") —> Chapter 4.5.3

Specifying the capacity of the weighing system ("Scale Capacity") —> Chapter 4.5.4

Choosing the resolution ("Resolution") —> Chapter 4.5.5

4.5.1 Defining the scale type (*SCALE –> Scale Build –> Scale Type*)

For the Viper T/RT only the scale type "Single Range" is available.

4.5.2 Specifying the base unit (*SCALE –> Scale Build –> Base Unit*)

The base unit can be specified in this menu. The base unit is used for determining the capacity of the weighing system and the resolution and has nothing to do with the weighing unit used for day-to-day operation (this is specified separately, see operating instructions). The following units are available: gram (g), kilogram (kg), metric ton (t), pound (lb) and ounce (oz).

Note: Only "g", "kg" and "t" are available on weighing systems that are suitable for certification to OIML. Only "kg" and "lb" are available on weighing systems that are suitable for certification to NTEP.

4.5.3 Choosing the verification interval (*SCALE –> Scale Build –> Verification Interval*)

This setting is only relevant for certifiable weighing systems (chapter 4.1). The following verification intervals are available: "e = d" (factory setting) and "e = 10d".

Note: If the verification interval is set to "e = 10d", the last digit of the weighing result is displayed in brackets (known as calibration brackets). These indicate that the last digit is not taken into account for calibration tolerance. If the verification interval is set to "e = d", the weighing result is displayed without brackets.

4.5.4 Specifying the capacity of the weighing system (*SCALE –> Scale Build –> Scale Capacity*)

The capacity of the weighing system must be specified when building a new scale using a Viper RT terminal.

Furthermore, if the analog PCB is replaced, it is necessary to specify the capacity, because the EEPROM on the PCB is set to a default value at the factory. With Viper scales the capacity is shown on the plate above the display and must be set to this value. It is also necessary to set the capacity if a load cell of a different capacity is installed. In this case the capacity must be set in accordance with the load cell used (see specifications in section 8).

4.5.5 Choosing the resolution (*SCALE –> Scale Build –> Resolution*)

The resolution must be specified when building a new scale using a Viper terminal.

Furthermore, the resolution has to be specified if the analog PCB is replaced, as its EEPROM is factory-set to a basic value. With Viper scales the resolution is indicated on the plate above the display and must be set to this value. The resolution also needs to be set if a load cell of a different capacity or a different type (e.g. MonoBloc instead of strain gauge) is fitted. In this case the resolution must be entered according to the load cell used (see technical data in section 8 of this Service Manual). The available resolutions depend on the capacity of the weighing system.

4.6 Setting the GEO adjustment value (*SCALE –> Geo Value*)

The geo adjustment value is used to adjust the weighing system to local gravity conditions (setting range 0 – 31). The table of geo adjustment values can be found in section 8. **Please note**: The geo adjustment value must not be reset after calibration since otherwise the calibration values will become invalid!

4.7 Linearization with simultaneous calibration (*SCALE –> LIN-CAL*)

In this menu block the weighing system can be linearized and calibrated simultaneously. The calibration is purely computational to compensate for shifts in the maximum load due to linearization. The loads placed on the pan are checked (±5%), so a basic calibration must already have been performed (see chapter 4.8).

Procedure:

- First place a preload on the pan, then select the type of linearization/calibration required:
  - 3-point linearization (default = 0%, 50% and 100% of the maximum load).
  - 5-point linearization (default = 0%, 25%, 50%, 75% and 100% of the maximum load).
- Start the linearization/calibration. The display begins to flash as the scale automatically determines the zero point. Determination of the zero point can be interrupted manually, in which case the existing zero point is used as a reference. This is particularly useful if larger scales have already been loaded with heavy test weights, which would have to be removed in order to determine the zero point.
- Once the zero point has been determined, the display prompts you to load a weight (half load for 3-point linearization, quarter load for 5-point linearization). Change the weight if required (available values depend on the capacity of the weighing system).
- Once the weight has been placed on the scale and its value confirmed, linearization is performed at the first point. The display then prompts for additional weights (the number depends on the type of linearization chosen), which again can be changed if necessary. At the last linearization point the scale is also calibrated at the same time.
- Once linearization has been performed at all points, the display confirms that linearization/calibration has been successfully completed.

4.8 Basic calibration (*SCALE –> Calibration*)

The basic calibration corresponds to the calibration function for the supervisor, except that the supervisor cannot specify a preload. The basic calibration uses the display unit 1 (*SCALE –> Display –> Unit 1*).

Procedure:

- Before calibration the geo adjustment value should be checked and corrected if necessary (chapter 4.6). It cannot be changed again subsequently.
- Start the calibration. You will be prompted to confirm the preload. Place the desired preload on the pan and confirm it. If there is already a test load on the scale, measurement of the preload can be interrupted manually, in which case the existing zero point is used as a reference. This is useful if larger scales have already been loaded with heavy test weights, which would have to be removed in order to determine the preload.
- Once the preload has been measured, the display prompts you to place the calibration weight corresponding to the maximum load on the pan. If you do **not** want to calibrate with this value (e.g. because not enough weights are available), you can choose a different value (available values depend on the capacity of the weighing system). **Note**: You are generally recommended to calibrate the scale **at maximum load**, especially in the case of **certifiable scales**.
- Place the desired weight on the pan and confirm its value. Calibration is now performed, after which its successful completion is briefly confirmed.

4.9 Activating control mode (*SCALE –> Control Mode*)

In this menu the current weighing result is displayed at high resolution (without the weighing unit). This enables the weighing system to be checked after calibration and/or linearization, for example.

4.10 Settings for the zero point (*SCALE –> Zero*)

This menu includes a number of submenus with settings for the zero point. These submenus are described in the following sections:

Specifying the zero capturing range ("Zero-Capture") —> Chapter 4.10.1

Moving the calibration zero point ("Set Zero") —> Chapter 4.10.2

This menu block also includes the auto zero block. This menu block is also available to the supervisor so it is not described here (see operating instructions).

4.10.1 Specifying the zero capturing range (*SCALE –> Zero –> Zero-Capt.*)

This menu can be used to specify the range in which the scale is set to zero when it is switched on or when «→0←» pressed. The following settings are available:

"–2%/2%" The zero capturing range is –2% to +2% of the nominal load

"–2%/+18%" The zero capturing range is –2% to +18% of the nominal load

Note: The zero capturing range affects the nominal capacity of the weighing system. If the capacity of a load cell is fully utilized, the zero capturing range can be reduced to –2% to +2%.

4.10.2 Shifting the calibration zero point (*SCALE –> Zero –> Set Zero*)

The calibration zero point can be moved in this menu. This is necessary if an auxiliary preload is used or if calibration cannot be performed with the existing preload and it is outside the zero capturing range (in which case the scale would not be able to start up). The corresponding preload must be in position in order for "Set Zero" to be executed. The zero point for calibration by the supervisor is moved to this value, as is the reference point for the zero capturing range.

Procedure:

- Ensure that the preload for which the calibration zero point is to be moved is in place.
- Start the function. You will see a prompt asking you if you really want to move the calibration zero point. The calibration zero point is moved when you confirm the prompt.

If the display signals an underload or overload when you quit this menu, switch the scale off and then on again.

4.11 Settings in the "TERMINAL" menu block

Most of the TERMINAL menu block is also available to the supervisor and is therefore not described here (see operating instructions). However, this menu block includes one submenu that is restricted to the service engineer and is described below.

4.11.1 Defining a timeout (*TERMINAL –> Timeout*)

In this menu you can limit the period of time for which the scale is used. This is particularly useful for leased scales, since it prevents the scale for being used for longer than the agreed period. The following settings are available:

"Not active" There is no restriction on the period of use of the scale (factory setting).

"Days" Enter the number of days (1 – 999) for which the scale can be used. The period of use commences from the start of the next day. Once the preset period of use has expired, the scale will still start up but will not perform any measurements and instead displays a message stating that the period of use has expired.

5 Preparing Viper weighing systems for certification

Preparing Viper weighing systems for certification requires the following steps:

1. Make sure the **capacity** (weighing range) and **resolution** of the weighing system (entered in the technician setup) comply with with the certificate of conformance that applies to your country.

   The respective settings are described in the following chapters:

   Capacity: Chapter 3.1.3 for Viper M/RM, L/RL and D/RD
   Chapter 4.5.4 for Viper T/RT

   Resolution: Chapter 3.1.3 for Viper M/RM, L/RL und D/RD
   Chapter 4.5.5 for Viper T/RT

2. Make sure the **GEO value** (geographical adjustment value, entered in the technician setup) corresponds to your region.

   The respective setting is described in the following chapters:

   – Chapter 3.1.5 for Viper M/RM, L/RL und D/RD
   – Chapter 4.6 for Viper T/RT

3. In the technician setup declare the weighing system to be "certifiable". **Admissibility for certification** to "NTEP" is available for Viper M/RM, L/RL and D/RD while with the Viper T/RT you may either choose "NTEP" or "OIML", depending on national legislation.

   The respective setting is described in the following chapters:

   – Chapter 3.1.2 for Viper M/RM, L/RL und D/RD
   – Chapter 4.1 for Viper T/RT

4. Install the "**certification set**" available as an optional upgrade kit (part no. 21203903, see section 4 of this Service Manual).

Section 8

Miscellaneous information

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1 Technical data

The following chapters hold the technical specifications of the **Viper scales**. The specifications of **Viper terminals** are found in the respective Operator Manuals.

1.1 Certified Viper scales with strain gauge load cells

The following data apply to all certified Viper scales with strain gauge load cells, regardless of platform size.

Scale capacity	**3 kg 6 lb**	**6 kg 12 lb**	**12 kg 30 lb**	**30 kg 60 lb**	**60 kg 120 lb**
Weighing range	3.0045 kg 6.009 lb	6.009 kg 12.018 lb	12.018 kg 30.045 lb	30.045 kg 60.09 lb	60.09 kg 120.18 lb
Resolution	6000e	6000e	6000e	6000e	6000e
Certification class	III	III	III	III	III
Readability	0.0005 kg 0.001 lb	0.001 kg 0.002 lb	0.002 kg 0.005 lb	0.005 kg 0.01 lb	0.01 kg 0.02 lb
Repeatability	0.0005 kg 0.001 lb	0.001 kg 0.002 lb	0.002 kg 0.005 lb	0.005 kg 0.01 lb	0.01 kg 0.02 lb
Calibration weight, minimum [1)]	1 kg 2 lb	2 kg 4 lb	5 kg 10 lb	10 kg 20 lb	15 kg 30 lb
Overload stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable
Cornerload stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable

[1)] Note on calibration

Certified scales should be calibrated at full load.

1.2 Noncertifiable Viper scales with strain gauge load cells

The following data apply to all noncertifiable Viper scales with strain gauge load cells, regardless of platform size.

Scale capacity	**3 kg 7.5 lb**	**6 kg 12 lb**	**12 kg 24 lb**	**30 kg 75 lb**	**60 kg 120 lb**
Weighing range	3.0018 kg 7.5045 lb	6.0045 kg 12.009 lb	12.009 kg 24.018 lb	30.018 kg 75.045 lb	60.045 kg 120.09 lb
Resolution	15000d	12000d	12000d	15000d	12000d
Certification class	---	---	---	---	---
Readability	0.0002 kg 0.0005 lb	0.0005 kg 0.001 lb	0.001 kg 0.002 lb	0.002 kg 0.005 lb	0.005 kg 0.01 lb
Repeatability	0.0002 kg 0.0005 lb	0.0005 kg 0.001 lb	0.001 kg 0.002 lb	0.002 kg 0.005 lb	0.005 kg 0.01 lb
Calibration weight, minimum [1)]	1 kg 2 lb	2 kg 4 lb	5 kg 10 lb	10 kg 20 lb	15 kg 30 lb
Overload stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable
Cornerload stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable

[1)] Note on calibration

It is recommended that noncertifiable scales are also calibrated at full load. If required, however, these can also be calibrated at less than full load (minimum approx. 25% of full load).

1.3 Certified Viper scales with MonoBloc load cells

The following data apply to all certified Viper scales with MonoBloc load cells, regardless of platform size.

Scale capacity	**3 kg 6 lb**	**6 kg 12 lb**	**12 kg 24 lb**	**30 kg 60 lb**
Weighing range	3.00009 kg 6.00018 lb	6.0009 kg 12.0018 lb	12.0009 kg 24.0018 lb	30.0009 kg 60.0018 lb
Resolution	30000e	6000e	12000e	30000e
Certification class	II	II	II	II
Readability (d)	0.00001 kg 0.00002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb
Repeatability	0.00001 kg 0.00002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb
Calibration weight, minimum [1)]	1 kg 2 lb	2 kg 4 lb	5 kg 10 lb	10 kg 20 lb
Overload stop				
small platform	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable
large platform	——	0.3 mm	0.3 mm	0.3 mm
Corner load stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable

[1)] Note on calibration

Certified scales should be calibrated at full load.

1.4 Noncertifiable Viper scales with MonoBloc load cells

The following data apply to all noncertifiable Viper scales with MonoBloc load cells, regardless of platform size.

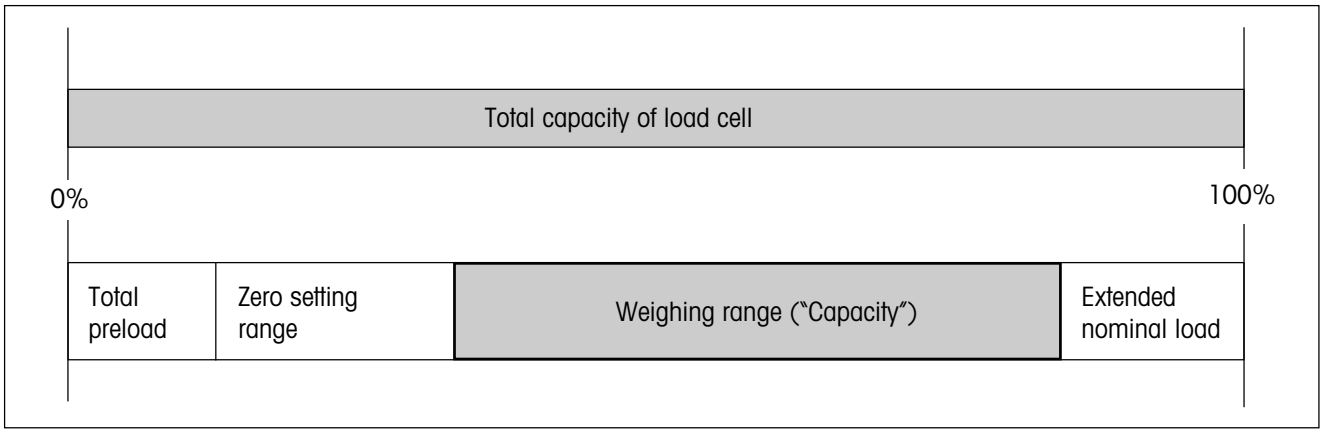
Scale capacity	**3 kg 6 lb**	**6 kg 12 lb**	**12 kg 24 lb**	**30 kg 60 lb**
Weighing range	3.00009 kg 6.00018 lb	6.0009 kg 12.0018 lb	12.0009 kg 24.0018 lb	30.0009 kg 60.0018 lb
Resolution	300000d	60000d	120000d	300000d
Certification class	---	---	---	---
Readability	0.00001 kg 0.00002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb
Repeatability	0.00001 kg 0.00002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb	0.0001 kg 0.0002 lb
Calibration weight, minimum [1)]	1 kg 2 lb	2 kg 4 lb	5 kg 10 lb	10 kg 20 lb
Overload stop				
small platform	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable
large platform	——	0.3 mm	0.3 mm	0.3 mm
Corner load stop	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable	fixed, not adjustable

[1)] Note on calibration

It is recommended that noncertifiable scales are also calibrated at full load. These can also be calibrated at less than full load (minimum approx. 25% of full load), as required.

2 Notes on load cell capacities

The following diagram is a schematic summary of the distribution of the total capacity of a load cell.



Total capacity of load cell

The total capacity of the load cell is the combined sum of the weighing range, the total preload, the zero setting range and any extended nominal load (if any).

Total preload

The sum of all fittings and equipment that are acting on the load cell upon calibration (load plate support, load plate, roller track, etc.).

Zero setting range on power-up

±10% for certified and noncertifiable Viper M, L and D scales starting from the calibrated zero point of the weighing range. On Viper T scales the technician setup offers a choice of two zero setting ranges (–2%/18% or –2%/2%).

Weighing range

The weighing range ("Capacity") is specified in the setup (section 5).

Note: If the resolution for certified scales is set to "e = 10d" in the technician setup, then the last decimal place of the weighing result is shown in brackets ("parentheses"). These indicate that the last decimal position is not considered for the calibration tolerance. If the resolution is set to "e = d", then the weighing result is shown without parentheses.

3 Overview of load cells and preloads

3.1 Strain gauge load cells

Viper model	Weighing pan [in.]	Weighing range [kg/lb]	Replacement cell no.	Preload load plate support	Preload weighing pan	Total of load plate support and weighing pan	Mechanical preload reserve	Preload reserve switch-on zero (max. ±10%)	Cell capacity [kg/lb]
Px (small)	7.9" x 9.5"	3 kg 7.5 lb	21203873	0.340 kg 0.750 lb	0.500 kg 1.102 lb	0.840 kg 1.852 lb	1.160 kg 1.648 lb	0.30 kg 0.75 lb	5 kg 11 lb
Px (small)	7.9" x 9.5"	6 kg 12 lb	21203874	0.340 kg 0.750 lb	0.500 kg 1.102 lb	0.840 kg 1.852 lb	3.160 kg 8.148 lb	0.60 kg 1.20 lb	10 kg 22 lb
Px (small)	7.9" x 9.5"	12 kg 24 lb	21203875	0.340 kg 0.750 lb	0.500 kg 1.102 lb	0.840 kg 1.852 lb	7.160 kg 18.148 lb	1.20 kg 2.40 lb	20 kg 44 lb
Sx (large)	9.5" x 13.8"	12 kg 24 lb	21203886	0.820 kg 1.874 lb	0.850 kg 1.874 lb	1.670 kg 3.682 lb	6.330 kg 16.318 lb	1.20 kg 2.40 lb	20 kg 44 lb
Sx (large)	9.5" x 13.8"	30 kg 75 lb	21203886	0.820 kg 1.874 lb	0.850 kg 1.874 lb	1.670 kg 3.682 lb	18.33 kg 31.318 lb	3.00 kg 7.50 lb	50 kg 110 lb
Sx (large)	9.5" x 13.8"	60 kg 120 lb	21203887	0.820 kg 1.874 lb	0.850 kg 1.874 lb	1.670 kg 3.682 lb	38.33 kg 96.318 lb	6.00 kg 12.00 lb	100 kg 220 lb

x = scale series (M, L or D)

***** The spare part numbers refer to the new "LC" load cells. The previous "C…MRS" and "C…MRL" load cells are no longer available as spares (see sections 2 and 3 of this Service Manual).

3.2 MonoBloc load cells

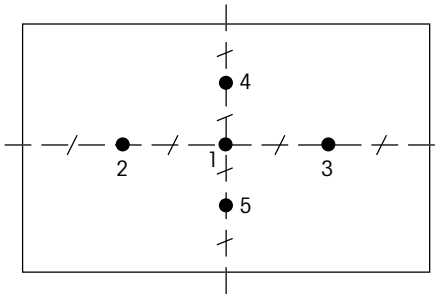
Viper model	Weighing pan [in.]	Weighing range [kg/lb]	Replacement weighing module no.	Preload load plate support	Preload weighing pan	Total of load plate support and weighing pan	Mechanical preload reserve	Preload reserve switch-on zero (max. ±10%)	Cell capacity [kg/lb]
Px MB (small)	6.5" x 6.5"	3 kg 6 lb	11102685 21204011 [1)]	0.340 kg 0.750 lb	0.225 kg 0.496 lb	0.560 kg 1.235 lb	0.540 kg 1.805 lb	0.30 kg 0.60 lb	4.10 kg 9.04 lb
Px MB (small)	7.9" x 9.5"	6 kg 12 lb	11102686 21204012 [1)]	0.360 kg 0.794 lb	0.500 kg 1.102 lb	0.860 kg 1.896 lb	3.140 kg 8.154 lb	0.60 kg 1.20 lb	10.00 kg 22.05 lb
Sx MB (large)	9.5" x 13.8"	12 kg 24 lb	11102687 21204013 [1)]	0.820 kg 1.874 lb	0.850 kg 1.874 lb	1.670 kg 3.682 lb	30.330 kg 69.318 lb	1.20 kg 2.40 lb	44.00 kg 97.00 lb
Sx MB (large)	9.5" x 13.8"	30 kg 60 lb	11102687 21204013 [1)]	0.820 kg 1.874 lb	0.850 kg 1.874 lb	1.670 kg 3.682 lb	12.330 kg 33.318 lb	3.00 kg 6.00 lb	44.00 kg 97.00 lb

x = scale series (M, L or D)

[1)] weighing module for Ex scales

4 Shift test

A shift test shall be conducted with a **half-capacity** test load.



First place the test load in the center of the weighing pan, then move it successively to the 4 points equidistant between the center and the front, left, back and right edges of the weighing pan (see opposite figure). For the admissible tolerances refer to the tables below (scales legal for trade).

Tolerances for Viper strain gauge scales with factory resolution not legal for trade

These tolerances are factory recommendations
Maintenance Tolerance: ±3 digits for 12,000 digits and ±4 digits for 15,000 digits scale
Acceptance Tolerance: ±2 digits for 12,000 digits and ±3 digits for 15,000 digits scale

Capacity	Displayed digits	Test weight	Scale increment	Maintenance Tolerance	Acceptance Tolerance
3 kg / 7.5 lb	15,000	1.5 kg / 3 lb	0.2 g / 0.0005 lb	±0.8 g / ±0.002 lb	±0.6 g / ±0.0015 lb
6 kg / 12 lb	12,000	3 kg / 6 lb	0.5 g / 0.001 lb	±1.5 g / ±0.003 lb	±1.0 g / ± 0.002 lb
12 kg / 24 lb	12,000	6 kg / 12 lb	1 g / 0.002 lb	±3 g / ±0.006 lb	±2.0 g / ±0.004 lb
30 kg / 75 lb	15,000	15 kg / 30 lb	2 g / 0.005 lb	±8 g / ±0.02 lb	±6 g / ±0.015 lb
60 kg / 120 lb	12,000	30 kg / 60 lb	5g / 0.01 lb	±15 g / ±0.03 lb	±10 g / ±0.03 lb

Tolerances for Viper MonoBloc scales with factory resolution not legal for trade

These tolerances are factory recommendations
Maintenance Tolerance: ±4 digits
Acceptance Tolerance: ±3 digits

Capacity	Displayed digits	Test weight	Scale increment	Maintenance Tolerance	Acceptance Tolerance
3 kg / 6 lb	300,000	1.5 kg / 3 lb	0.01 g / 0.00002 lb	±0.04 g / ±0.00008 lb	±0.03 g / ±0.00006 lb
6 kg / 12 lb	60,000	3 kg / 6 lb	0.1 g / 0.0001 lb	±0.4 g / ±0.0004 lb	±0.3 g / ±0.0006 lb
12 kg / 24 lb	120,000	6 kg / 12 lb	0.1 g / 0.0001 lb	±0.4 g / ±0.0004 lb	±0.3 g / ±0.0006 lb
30 kg / 60 lb	300,000	15 kg / 30 lb	0.1 g / 0.0001 lb	±0.4 g / ±0.0004 lb	±0.3 g / ±0.0006 lb

Tolerances for Viper strain gauge scales legal for trade

The Viper strain gauge is NTEP approved for Class III, 6000 d
Maintenance Tolerances are ±3 graduates
Acceptance Tolerances are ±1.5 graduates

Capacity	Test-weight	Scale increment	Maintenance Tolerance	Acceptance Tolerance
3 kg /6 lb	1.5 kg / 3 lb	0.5 g / 0.001 lb	±1.5 g / ±0.003 lb	±0.75 g / ±0.0015 lb
6 kg /12 lb	3 kg / 6 lb	1 g / 0.002 lb	±3 g / ±0.006 lb	±1.5 g / ±0.003 lb
12 kg /24 lb	6 kg / 12 lb	2 g / 0.005 lb	±6 g / ±0.015 lb	±3 g / ±0.0075 lb
30 kg /75 lb	15 kg / 40 lb	5 g / 0.01 lb	±15 g / ±0.03 lb	±7.5 g / ±0.015 lb
60 kg /120 lb	30 kg / 60 lb	10 g / 0.02 lb	±30 g / ±0.06 lb	±15 g / ±0.03 lb

Tolerances for Viper MonoBloc scales legal for trade

The Viper MonoBloc will be NTEP approved for Class II, up to 30000 d
Maintenance Tolerances are ±2 graduates (6 kg /12 lb model: ±1 graduate)
Acceptance Tolerances are ±1 graduate (6 kg /12 lb model: ±0.5 graduate)

Capacity	Test-weight	Scale increment	Maintenance Tolerance	Acceptance Tolerance
3 kg /6 lb	1.5 kg / 3 lb	0.1 g / 0.0002 lb	±0.2 g / ±0.0004 lb	±0.1 g / ±0.0002 lb
6 kg /12 lb	3 kg / 6 lb	1 g / 0.002 lb	±1g / ±0.002 lb	±0.5 g / ±0.001 lb
12 kg /24 lb	6 kg / 12 lb	1 g / 0.002 lb	±2 g / ±0.004 lb	±1 g / ±0.002 lb
30 kg /60 lb	15 kg / 30 lb	1 g / 0.002 lb	±2 g / ±0.004 lb	±1 g / ±0.002 lb

5 Notes on attaching weighing platforms to Viper terminals and to the optional analog interface of Viper scales

All analog weighing platforms can be attached to Viper terminals if they conform to the required specifications (see chapter 5). The standard delivery of the terminal includes an appropriate Sub D connector for the weighing platform.

A second weighing platform can be attached to Viper terminals and scales equipped with the **optional analog interface** (Viper L, D and T scales and Viper RL, RD and RT terminals only). Compact two-scale systems can therefore be constructed using just one terminal or scale.

The standard interface for the weighing platform as well as the optional analog interface for a second weighing platform employ 9-pin Sub D sockets located on the rear of the terminal or the scale, respectively.

5.1 Instructions on weighing cells

5.1.1 Requirements for the weighing cell

Nominal load	0.1 ... 999 999.9 (g, kg, lb, oz, t)
Admissible impedance	80 Ohm ... 1000 Ohm Measure between Si+ and Si– or Ex+ and Ex– while weighing cell is disconnected
Differential signal	–1 mV ... 25 mV (see example below)

Example for calculating the differential signal:

Data of the weighing cell: sensitivity of 2 mV/V and cell capacity of 100 kg

Calculating the **differential signal for nom. load** (60 kg): 2 mV/V • 8.2 V • 60 kg/100 kg = 9.84 mV

Calculating the **differential signal for half load** (30 kg): 2 mV/V • 8.2 V • 30 kg/100 kg = 4.92 mV

Requirements for certifiable scales

- Certifiable weighing cell with SENSE lines (6 wires), sensitivity of the cell of 2 mV/V or 3 mV/V.
- The scale must be configured in the technician setup as certifiable.
- Approved markings from the manufacturer.

5.1.2 Selecting the weighing cell(s)

The following data must be known in order to determine the capacity of the weighing cell:

- **Scale capacity**: This generally corresponds to the heaviest load that is to be weighed with the weighing system.
- **Preload**: This is the total weight of all parts applied to the weighing cell. This includes the upper part of the weighing platform, the weighing pan and all other components such as a roller track, a fixed weighing container, etc.
- **Total zero setting range**: This consists of the switch-on zero setting range and the zero setting range that the user has available with the «**→0←**» key. With Viper RM, RL and RD terminals these zero setting ranges are adjusted separately in the menu while Viper RT terminals offer a single setting, covering both the switch-on zero setting range and the tero-setting range of the «**→0←**» key.

The sum of the weighing capacity, preload and total zero setting range thus gives the total capacity of the weighing cell required. An additional safety margin should also be included in order to prevent weighing cells from being overloaded.

Total capacity of weighing cell(s) = scale capacity + preload + total zero setting range + safety margin

For **systems with several weighing cells**, the total theoretical capacity is divided by the number of cells (max. 4) in order to determine the capacity of the individual cell. A sufficient safety margin is especially important if the weighing platform is heavily loaded in the corner areas so that the load is no longer evenly distributed over all cells.

For **systems with lever mechanisms**, the total theoretical capacity is divided by the transmission ratio of the lever system in order to determine the capacity of the cell.

When selecting the weighing cell(s), other parameters are also to be taken into account. These include:

- the smallest display step desired
- requirements for admissibility for certification
- number and type of weighing ranges

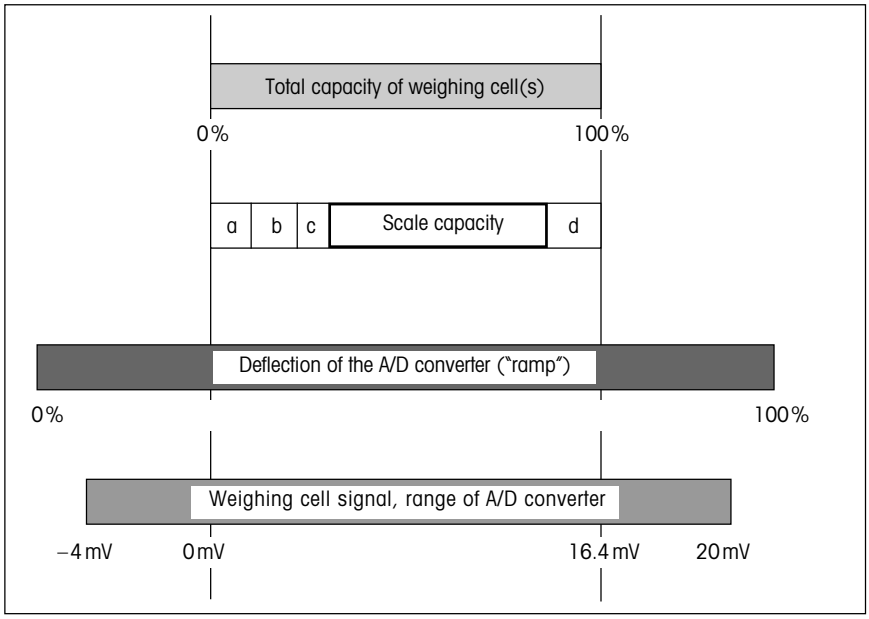
The terminal supplies a **voltage** of 8.2 V to the weighing cell(s). The **maximum weighing signal** is determined by multiplying the power supply voltage by the sensitivity of the weighing cell:

Sensitivity of the cell	2 mv/V	3 mv/V
Power supply voltage	8.2 V	8.2 V
Max. weighing signal [1]	16.4 mV	24.6 mV [1]
Min. weighing signal per display step (for certifiable weighing systems)	1.3 µV/e	1.3 µV/e

[1] Only 20 mV measurable by the A/D converter, so that scale capacity is only max. 81% of the cell capacity.

5.1.3 Measuring ranges of the Viper terminals and scales

When setting up a weighing system, consider the measuring ranges of the Viper terminals and scales according to the summary given below.



a: Total preload applied to weighing cell when calibrating (upper part of platform, weighing pan, roller track, etc.)

b: Switch-on zero capturing range (adjustable in the menu) [1]

c: Zero setting range with «→0←» key (adjustable in the menu) [1]

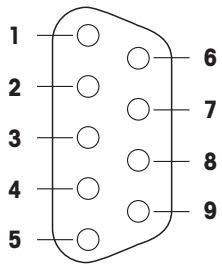
d: Safety margin

[1] The menu of Viper RT terminals and scales provides a single setting that applies to both the switch-on zero setting range and the zero setting range of the «→0←» key.

5.2 Attaching the weighing platform

The illustration at left shows the numbering of the individual pins of the Sub D sockets at the back of the terminal or scale (looking onto the socket). The pin assignment of the interface is shown in the following table. The pin assignment is the same for the standard weighing platform interface and the optional analog interface for a second weighing platform.

Pin assignment

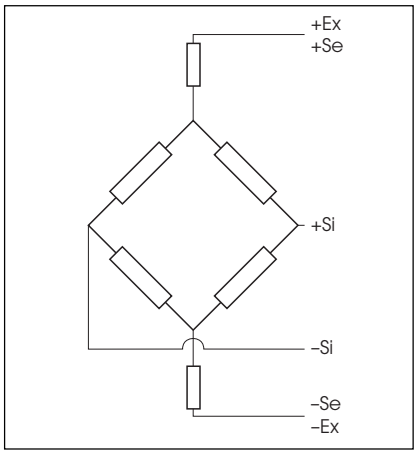


Pin	Assignment
Pin 1	+ Excitation (+8.2 V)
Pin 2	+ Sense
Pin 3	Shield
Pin 4	– Sense
Pin 5	– Excitation (GND)
Pin 6	not assigned
Pin 7	+ Signal
Pin 8	– Signal
Pin 9	not assigned

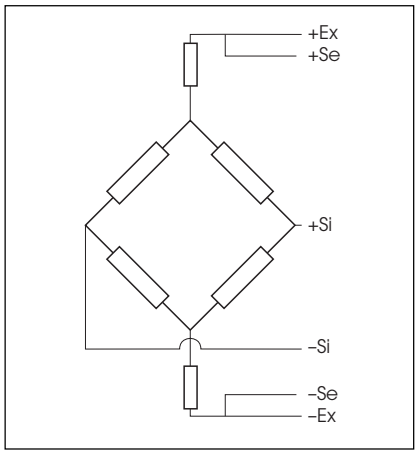
Solder the wires of the weighing platform to the appropriate pins of the Sub D connector observing the wiring scheme supplied with the weighing platform.

Important: In case the weighing platform employs a measuring cell without SENSE lines, pins 1 (+ Excitation) and 2 (+ Sense) must be short-circuited at the Sub D connector, as well as pins 5 (– Excitation) and 4 (– Sense).

Cells without SENSE lines



Cells with SENSE lines
(required for certifiable weighing systems)



Plug the Sub D connector of the weighing platform into the appropriate socket of the terminal or scale (standard weighing platform socket or socket of optional analog interface). **Note**: Connecting a second weighing platform to the optional analog interface of Viper terminals assumes that a primary weighing platform is already attached to the standard interface of the terminal.

Important: After attaching a second weighing platform to the optional analog interface, the "Analog" setting must be activated in the menu "SCALE –> Scale2 –> Type", otherwise the terminal or scale wll not recognize the platform.

Furthermore, for piece counting you have to set up the second platform for reference weighing ("Ref") or bulk weighing ("Bulk") in the menu "SCALE –> Scale2 –> Mode".

These settings are explained in section 7 of this Service Manual.

Attaching weighing platforms with several weighing cells

Up to 4 weighing cells can be connected in parallel to a terminal. These weighing cells can be connected in the usual way using a junction box.

The sum of the rated capacities of the individual cells corresponds to the total capacity of the weighing system. When entering the weighing capacities in the menu-driven dialog (section 7 of this Service Manual), the values should be selected so that the individual cells are not overloaded!

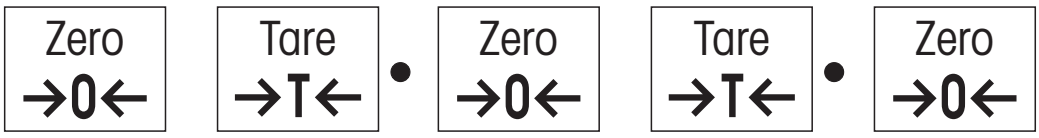
6 Table of geographical adjustment values

Geographical latitude in the northern or southern hemisphere in degrees and minutes	Elevation above sea level in meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
	325	650	975	1300	1625	1950	2275	2600	2925	3250	3575
	Elevation above sea level in feet										
	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660	11730
0° 0' - 5° 46'	5	4	4	3	3	2	2	1	1	0	0
5° 46' - 9° 52'	5	5	4	4	3	3	2	2	1	1	0
9° 52' - 12° 44'	6	5	5	4	4	3	3	2	2	1	1
12°44' - 15° 6'	6	6	5	5	4	4	3	3	2	2	1
15° 6' - 17° 10'	7	6	6	5	5	4	4	3	3	2	2
17°10' - 19° 2'	7	7	6	6	5	5	4	4	3	3	2
19° 2' - 20° 45'	8	7	7	6	6	5	5	4	4	3	3
20°45' - 22° 22'	8	8	7	7	6	6	5	5	4	4	3
22°22' - 23° 54'	9	8	8	7	7	6	6	5	5	4	4
23°54' - 25° 21'	9	9	8	8	7	7	6	6	5	5	4
25°21' - 26° 45'	10	9	9	8	8	7	7	6	6	5	5
26°45' - 28° 6'	10	10	9	9	8	8	7	7	6	6	5
28° 6' - 29° 25'	11	10	10	9	9	8	8	7	7	6	6
29°25' - 30° 41'	11	11	10	10	9	9	8	8	7	7	6
30°41' - 31° 56'	12	11	11	10	10	9	9	8	8	7	7
31°56' - 33° 9'	12	12	11	11	10	10	9	9	8	8	7
33° 9' - 34° 21'	13	12	12	11	11	10	10	9	9	8	8
34°21' - 35° 31'	13	13	12	12	11	11	10	10	9	9	8
35°31' - 36° 41'	14	13	13	12	12	11	11	10	10	9	9
36°41' - 37° 50'	14	14	13	13	12	12	11	11	10	10	9
37°50' - 38° 58'	15	14	14	13	13	12	12	11	11	10	10
38°58' - 40° 5'	15	15	14	14	13	13	12	12	11	11	10
40° 5' - 41° 12'	16	15	15	14	14	13	13	12	12	11	11
41°12' - 42° 19'	16	16	15	15	14	14	13	13	12	12	11
42°19' - 43° 26'	17	16	16	15	15	14	14	13	13	12	12
43°26' - 44° 32'	17	17	16	16	15	15	14	14	13	13	12
44°32' - 45° 38'	18	17	17	16	16	15	15	14	14	13	13
45°38' - 46° 45'	18	18	17	17	16	16	15	15	14	14	13
46°45' - 47° 51'	19	18	18	17	17	16	16	15	15	14	14
47°51' - 48° 58'	19	19	18	18	17	17	16	16	15	15	14
48°58' - 50° 6'	20	19	19	18	18	17	17	16	16	15	15
50° 6' - 51° 13'	20	20	19	19	18	18	17	17	16	16	15
51°13' - 52° 22'	21	20	20	19	19	18	18	17	17	16	16
52°22' - 53° 31'	21	21	20	20	19	19	18	18	17	17	16
53°31' - 54° 41'	22	21	21	20	20	19	19	18	18	17	17
54°41' - 55° 52'	22	22	21	21	20	20	19	19	18	18	17
55°52' - 57° 4'	23	22	22	21	21	20	20	19	19	18	18
57° 4' - 58° 17'	23	23	22	22	21	21	20	20	19	19	18
58°17' - 59° 32'	24	23	23	22	22	21	21	20	20	19	19
59°32' - 60° 49'	24	24	23	23	22	22	21	21	20	20	19
60°49' - 62° 9'	25	24	24	23	23	22	22	21	21	20	20
62° 9' - 63° 30'	25	25	24	24	23	23	22	22	21	21	20
63°30' - 64° 55'	26	25	25	24	24	23	23	22	22	21	21
64°55' - 66° 24'	26	26	25	25	24	24	23	23	22	22	21
66°24' - 67° 57'	27	26	26	25	25	24	24	23	23	22	22
67°57' - 69° 35'	27	27	26	26	25	25	24	24	23	23	22
69°35' - 71° 21'	28	27	27	26	26	25	25	24	24	23	23
71°21' - 73° 16'	28	28	27	27	26	26	25	25	24	24	23
73°16' - 75° 24'	29	28	28	27	27	26	26	25	25	24	24
75°24' - 77° 52'	29	29	28	28	27	27	26	26	25	25	24
77°52' - 80° 56'	30	29	29	28	28	27	27	26	26	25	25
80°56' - 85° 45'	30	30	29	29	28	28	27	27	26	26	25
85°45' - 90° 00'	31	30	30	29	29	28	28	27	27	26	26

Backdoor password for the technician (Viper M/RM, L/RL und D/RD)

Please cut and keep in a safe place!

Use this backdoor password in case you have set up your own technician password and lost it.



Section 9

Software

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4 Erasing the scale data stored in EEPROM 9-4

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5.2 Loading the software onto the scale or terminal 9-5

1 Software identification

The software for **Viper M and L scales with strain gauge load cells** and for **Viper RM and RL terminals** is held in an **EPROM on the digital PCB** and can therefore be replaced. **Viper D and T scales, Viper M and L scales with MonoBloc load cells** as well as **Viper RD and RT terminals** are equipped with a Flash Memory chip allowing new scale software to be loaded from a computer (see chapter 5).

The type of software depends on the type of scale or terminal (M, L, D or T) and on the type of load cell (strain gauge or MonoBloc). The various software versions are not compatible with one another. An illegible display can indicate that an incorrect software version is installed. The various models of a particular series with an identical type of load cell have identical software (e.g. Viper L 12lb/6kg MonoBloc and Viper L 24lb/12kg MonoBloc).

On powering up, the scale carries out a display test in which the software version is also briefly displayed (e.g. "L-1.01" or "Mb-1.00").

The leading characters or numerals designate the scale type and load cell used or the terminal type, while the following digits specify the actual software version (e.g. "1.07"):

M: Viper M scale with strain gauge load cell and Viper RM terminal (example as shown in the display: M-1.00)

L: Viper L scale with strain gauge load cell and Viper RL terminal (example as shown in the display: L-1.00)

D: Viper D scale with strain gauge load cell and Viper RD terminal (example as shown in the display: d-1.00)

4: Viper T scale with strain gauge load cell and Viper RT terminal (example as shown in the display: 4-1.00)

MB: Viper M scale with MonoBloc load cell (example as shown in the display: Mb-1.00)

LB: Viper L scale with MonoBloc load cell (example as shown in the display: Lb-1.00)

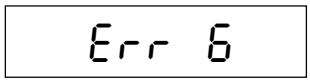
DB: Viper D scale with MonoBloc load cell (example as shown in the display: db-1.00)

14: Viper T scale with MonoBloc load cell (example as shown in the display: 14-1.00)

The **type data** for a weighing system are stored in the **EEPROM on the analog PCB** (serial number, weighing range, calibration data, etc., and also temperature compensation data for MonoBloc load cells). If there is a second weighing platform connected to a Viper scale or terminal via the **analog option**, its type data is stored on the **analog option board** (as well as all further settings in the "Scale 2" menu block). If the analog PCB (or analog option board) is replaced, this data no longer matches the scale and must be re-entered (section 7). **Temperature compensation data (TK data)** are also stored on the analog PCB of the MonoBloc scales and must be re-entered after replacing the analog PCB (chapter 3). **Note**: After replacing the analog PCB of any scale or terminal, all settings established by the user and the supervisor must be re-entered as these are also stored in the EEPROM.

2 Error messages after service work

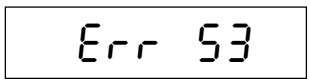
In addition to the errors described in the operating instructions, the following error messages may also appear after carrying out service work:



No calibration

This error only occurs after reinitializing the EEPROM, i.e. after rectifying Error 53.

Remedy: recalibrate the weighing system (see section 7).



Invalid data in EEPROM (checksum error)

This error message indicates defective scale definition data in the EEPROM.

Remedy: Completely reset the weighing system by erasing the data stored in the EEPROM (see chapter 4).

3 Printing out and reloading TK data (MonoBloc version only)

For scales with **MonoBloc load cells**, the load cell and analog PCB are usually replaced at the same time as their components are a matching set: the analog PCB contains all the temperature compensation data of the load cell (TK data). If only the analog PCB is to be replaced, then please note the following: a printout with the TK data of the load cell should be included in every scale. If this is not the case, then these data must be printed out **before the analog PCB is replaced**. Otherwise, the TK data cannot be loaded into the EEPROM of the new analog PCB. If, however, only the load cell is to be replaced, then its TK data must be known and loaded into the EEPROM of the existing analog PCB.
Note: Viper Ex scales require the PSU power supply unit in order to print out and reload TK data.

Printing out the temperature compensation of the measuring cell

If no printout of the load cell's TK data is available, then they can be printed out as follows:

```
ITK 1   12222.08
ITK 2   12165.29
ITK 3   12106.70
ITK 4   31842.41
ITK 5   31854.69
ITK 6   31867.59
ITK 7   51455.60
ITK 8   51536.88
ITK 9   51621.13
ITK 19   0.000000
ITK 11   1.500000
ITK 12   3.00000
ITK 13   33610.08
ITK 14   30896.57
ITK 15   27987.87
ITK 16  1

Chksum   :    379172.375
```

- Connect the scale (or the PSU power supply unit in the case of Viper Ex scales) to the RS323C interface of a computer using an appropriate interface cable.
- Set the interface of the scale and computer to the same parameters (protocol, parity, baud rate). Set the operating mode of the scale interface to "SICS".
- Start the communications program (e.g. "HyperTerminal") on the computer.
- Enter the SICS command "**ITK**" and terminate with <CRLF> (Return). The TK data of the load cell are read from the EEPROM of the analog PCB and transmitted to the computer.
- Print out the TK data from the communications program. The printout will look similar to the example on the left. Keep this printout in the scale!

Note: If the TK data of a load cell are not available or cannot be printed out, then these can be supplied by Mettler-Toledo. The serial number of the load cell must then also be stated (sticker on the cell).

Reloading the temperature compensation data

After replacing the analog PCB, the TK data of the load cell present must be loaded into the EEPROM of the new analog PCB:

- Connect the scale to the RS323C interface of a computer using a null modem cable.
- Set the interface of the scale and computer to the same parameters (protocol, parity, baud rate). Set the operating mode of the scale interface to "Dialog".
- Start the communications program (e.g. "HyperTerminal") on the computer.
- Enter all the TK data in order, according to the printout, and terminate every line with <CRLF> ("Return"). Example:

  ITK 1 12222.08 <CRLF>

  ITK 2 12165.29 <CRLF> etc.

  The line "Chksum" must not be entered.
- Enter the command "ITK" for control purposes. The TK data that were entered are then displayed. **Important**: The checksum ("Chksum") must agree with that in the printout. If this is not the case, then one or more TK values were entered incorrectly. The incorrect lines should now be entered correctly (e.g. "ITK9...") and the checksum verified again.

4 Erasing the scale data stored in EEPROM

In an emergency (e.g. an "Error 53") the type data of the weighing system can be deleted. This data is stored in the EEPROM on the analog board or, for the second weighing platform, in the EEPROM of the analog option. **Note**: This procedure does not erase the TK data of MonoBloc scales (see chapter 3). **Before you delete the data, print it out. This makes re-entering it aftwards much easier!**

Note: Deleting scale data on **Viper Ex scales** requires the PSU power supply unit.

The data can be deleted as follows:

Data of the Viper weghing system stored in the EEPROM on the analog board:

- Connect the scale or terminal (or the PSU power supply unit in the case of Viper Ex scales) to the RS323C interface of a computer using an appropriate interface cable.
- Set the interface of the scale or terminal and the computer to the same parameters (protocol, parity, baud rate). Set the operating mode of the scale interface to "SICS".
- Start the communications program (e.g. "HyperTerminal") on the computer.
- Enter the following command to delete the data (_ = space character):

  "**FLU_DEL_E2**" deletes the data in the EEPROM on the analog board.
- Proceed with <CRLF> (Return). The display briefly shows "Flush" to confirm the deletion of scale data, then the scale restarts.
- After restart the display shows "Error 6" (calibration data missing). All data must be re-entered and then the weighing system must be calibrated (see section 7). Flushing the EEPROM also deletes all individual settings established by the user and the supervisor and these data must be re-entered as well. The temperature compensation data (TK data) of scales with MonoBloc load cells are also stored in the EEPROM of the analog PCB. These data will not be erased, however, they should be verified after erasing the scale data (chapter 3).

Data of the second weighing platform in the EEPROM on the analog option board:

- Make sure the scale or terminal is switched on, then press the service switch (pushbutton) located on the analog option board until the display briefly shows "Flush" to confirm the deletion of data. Then the scale or terminal restarts.
- After restart the display shows "Error 6" (calibration data missing). All setup data of the second weighing platform must be re-entered and then the weighing system must be calibrated. Flushing the EEPROM also deletes all individual settings established by the user and the supervisor and these data must be re-entered as well.

5 Downloading new software to the Flash Memory (Viper D and T scales, all Viper MonoBloc scales, and Viper RD and RT terminals)

Viper D and T scales, all Viper MonoBloc scales, as well as Viper RD and RT terminals have a **Flash Memory chip** instead of an EPROM soldered to the digital PCB. In case of software malfunction or if a new software release becomes available, the present software can be replaced.

Loading new software onto the flash memory chip requires a special program, the so-called **Flash Loader** for the Microsoft Windows® operating system. You can obtain this program and the latest Viper software from Mettler-Toledo. (It is planned to make the software available on the Mettler-Toledo Extranet network in the near future).

The Flash Loader is used to load the software from the PC onto the scale or terminal. If for any reason this is not possible, the digital PCB on which the Flash Memory chip is soldered must be replaced (see sections 5 and 6).

5.1 Prerequisites

To be able to transfer the new software to the scale or terminal you need the following:

- PC Microsoft Windows® operating system (Version 95, 98, NT 4.0, ME, 2000 or XP)
- Connection cable PC–scale/terminal (RS232 cable, 9-pin sub-D connector m/f, part number 11101051)
- Flash Loader application
- File with new Viper software

Install both the Flash Loader and the Viper software **in the same folder** on any drive of the Windows PC.

5.2 Loading the software onto the scale or terminal

Before you can load the software onto the scale or terminal, you must connect the scale or terminal to the serial interface of the PC with the RS232 cable. **Note**: If the scale or terminal has additional optional interfaces, make sure the cable is always connected to the **standard RS232C interface (COM1)**!

Set the COM1 interface on the scale or terminal to the following values:

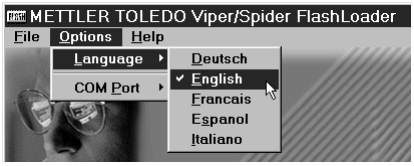
Operating mode:	Dialog
Data transmission rate:	9600 baud
Data bits/parity:	8 data bits/no parity ("8 none")
Transmission protocol:	"No" or "Xon/Xoff"

METTLER TOLEDO Viper/Spider FlashLoader
File Options Help
Connection Info...
Initial Setting
In order to enable this program to communicate with your METTLER TOLEDO scale, the computer and scale need to be connected properly.
Please connect your RS-232 cable (e.g. METTLER TOLEDO cable No. 11101051) to an available COM port on your computer and choose one of the ports below.
Mettler Toledo
Viper/Spider
FlashLoader
COM Port
COM1
COM3
COM2
COM4
Proceed

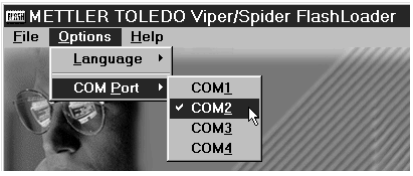
Start the Flash Loader. **The first time it is started** it prompts you to select the interface of the PC to which the scale or terminal is connected.

When you have selected the respective interface, click the "Proceed" button. You will then be prompted to connect the interface cable to the first serial interface of the scale or terminal (COM1).

Before you update the software on the scale or terminal you should select the dialog language and check a number of settings as described below.



Select the **language** in which you wish to be guided through the updating procedure. You only have to do the setting once because Flash Loader stores the setting.



Check which **interface** of the computer the scale or terminal is connected to. You can change the PC interface selected at the first start of the Flash Loader at any time in this menu.

In the "Help" menu check whether communication with the scale or terminal is working. In the example shown, the Flash Loader confirms that a scale is connected (see bottom line).

If the Flash Loader indicates that no scale is connected, first check whether the correct interface has been selected (see above) and if necessary, whether the communication settings of the scale or terminal are correct.

When you have made the necessary settings and checked the connections, you can start the updating procedure. To start the procedure, click on "**Start Software Update Procedure**" in the main screen of the Flash Loader or in the "File" menu. Follow the instructions of the Flash Loader, which will guide you through the updating procedure step by step. Note: If the Flash Loader folder contains more than one software update file, you will be prompted to select the desired file.

When the updating procedure is complete, you can terminate the Flash Loader. Switch off the scale or terminal and then switch it on again. While it is starting up, check the software version it displays. It is advisable to check the type data and menu settings.

P21203788

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